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NEWSPAPER

A simple four-line Fortran program helped these Cal Tech students win a Datsun in a McDonald's contest when they generated 1.2 million entry blanks on an IBM 370/158. Although McDonald's was less than delighted, one student said, "Just because it is unexpected doesn't mean it's unfair."

Technology, McDonald's Collide As Students Best Burger Bonanza

By Catherine Arnst
Of the CW Staff

PASADENA, Calif. – McDonald's Restaurants, whose hamburgers have taken their place along with Mom and apple pie as a piece of Americana, was recently confronted by a computer and 26 students from the California Institute of Technology (Cal Tech) following another American tradition – free enterprise.

It started when 187 McDonald's in five counties of southern California held a sweepstake during March. The $40,000 worth of prizes included a new sports car, a year's free groceries, a station wagon and free McDonald's coupons.

Entrants were required only to be a resident of one of the five counties and fill out either an entry blank or a three-by-five piece of paper with their name and address. No purchase was required and there was no limit to the number of times each person could enter.

The Cal Tech students, headed by senior John Denker, realized these rules presented them with an opportunity to turn their DP training to a money-making advantage.

The students used the school's IBM 370/158 to print out 1.2 million entry blanks with their names on them. Denker said enough paper was used to cover "two and one half football fields or [reach] higher than a three-story building."

The program they wrote consisted of four simple lines of Fortran. Although Denker admitted it probably would have been more practical to have a regular printer do the entry blanks, the students

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EFTS Limitation Set With Distance Ruling

WASHINGTON, D.C. – National banks have been forbidden by the U.S. Comptroller of the Currency to establish electronic money machines more than 50 miles from their headquarters or closest branch office.

Ordered to allay the fears of small banks that a few giant banks could cover a state or the entire country with terminals and so dominate the banking industry, the 50-mile limit does not apply where a terminal is shared with one or more other local financial institutions, such as another bank or a savings and loan association, according to the comptroller's office.

The mileage limitation is contained in amendments to an earlier ruling by Comptroller James E. Smith permitting federally chartered banks to establish terminals in supermarkets, shopping centers

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Recognition of DP Manager Solidifying, Auerbach Finds

By Edith Holmes
Of the CW Staff

PHILADELPHIA – The "EDP specialist" of the 1960s, known first for his technical expertise and only secondarily for his ability to manage, has been replaced in the '70s by the "DP manager" who must handle people as well as – if not better than – he manages machines.

The growing dependence of business on computing demands there continue to be "an increasing recognition of the functions of the DP manager as to his importance in the corporate hierarchy as well as to his relationship to other managers," an Auerbach study profiling the DP manager added.

Designed to determine how the DP manager views himself, the study stemmed from some 300 responses to a survey sent to the senior DP executives of approximately 3,000 international corporations, educational institutions and government agencies. Auerbach asked these people about their jobs and themselves in a questionnaire mailed last fall.

While the DP manager in the '60s, "if he had such a title, was mainly a technician who probably had some accounting background," today's top data processor is involved with "more personnel management, budget responsibility and interaction with other functional managers within the corporation," Auerbach found.

This expansion of the DP function has brought attendant problems related both to technological and managerial expectations, the study noted.

These include continual hardware and software developments whose benefits can be oversold to upper management; a proliferation of applications which involve all aspects of a corporate, educational or governmental operation; demands from upper management for quick response to questions or projects without an understanding of the complications and expenses involved; and vague career paths which can cloud and confuse the advancement of the DP manager in his career.

Auerbach noted there has been "an increasing recognition of the need to upgrade the executive responsible for the direction and implementation of the DP function," but added some corporate managements continue to be unwilling "to prescribe a career path that specifically defines potential opportunities for the DP executive."

Titled Means Touted

Both the titles of the DP executives and the titles of those to whom they report revealed acceptance of the function's importance.

Commenting that "Data Processing Manager" was the title most frequently used, Auerbach said there was "no obvious relationship between the size of the company or its geographic location and the pattern of titles."

The tone of such titles as "Manager of Information Systems," "Director of Corporate Systems and "Vice-President, Data Processing Division" recognizes "the DP function's wider application as both a service performed for an entire organization and its inclusive responsibility for handling all information," the research organization stated.

And, while the DP manager normally reported to an executive in the accounting department, such as the controller, in the earlier days of the DP industry, today's top DP executive is directly re-

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Won't Create Professionals

Licensing 'Oppressive': Glaser

By Edith Holmes
Of the CW Staff

SAN MATEO, Calif. – Neither a license nor a certificate can make someone a professional, according to George Glaser, outgoing president of the American Federation of Information Processing Societies (Afips).

"In my view, being a professional is as much a matter of personal attitudes and bearing as it is a matter of having a particular body of knowledge or skills," he said in a recent interview.

"I've met some very professional carpenters and gardeners who, it might be argued, are tradesmen. I've also met or known the work of some DP people that could hardly be called professional."

Characterizing "professionals" as "people who try very hard for some excellence in what they do," Glaser said their personal responsibility "to do things right" is largely self-motivated. And he indicated a personal aversion to having some other body – be it a governmental agency or a board established by the professional societies – "make that decision to be a professional for me."

Legislation Now 'Oppressive'

"I think licensing for DP is premature at this time," Glaser said. "I have read the proposed legislation drafted by the Society of Certified Data Processors several times and feel that at this point such legislation would only be oppressive."

Certification as conducted by the Institute for Certification of Computer Professionals (ICCP), however, is another matter in Glaser's view. "Certification is at least a step in the right direction, but maybe for reasons other than the certificate itself," he stated.

"The primary value of the program is that it has encouraged these individuals

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Acpa Joins Licensing Crusade

By Patrick Ward
Of the CW Staff

CHICAGO – There's a new licensing proposal out that would extend to pocket calculator users, establish DP "grand masters" and separate violators from their coding sheets and pencils for a two-week stretch.

Submitted by James M. Brown of the Chicago chapter of the Association of Computer Programmers and Analysts (Acpa), the draft describes licensing as "the ultimate in impractical boondoggles."

But "since that fact isn't stopping too many other people, we felt we had to make our contribution," Brown said.

The draft is intended to regulate usage of medium- to large-scale mainframes. "However, insofar as the size of machinery does not limit potential damage done, this act shall also apply to minicomputers, small business computers, large adding machines and all pocket calculators," the draft declares.

"Moreover, to be logically consistent . . . the provisions of this act shall also be binding on any person who reads, writes and/or thinks."

To obtain the license, experience of three years using a large-scale operating system, four years using a smaller disk operating system or six years using a computer without operating systems is required. Failing that, "nine years of counting to 10 on your fingers" will do.

"Recognizing the need for intelligent, well-rounded practitioners and the import and relevance of a college education . . . a degree from a duly accredited institution of higher learning may be substituted for 15 minutes of experience," according to the draft.

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To Explain Unbundling Policy

Catamore Puts IBM Executive on Stand

By Molly Upton
Of the CW Staff

PROVIDENCE, R.I. – The issue of whether IBM's unbundling policy pertains to the charge of fraud filed in the countercharge against IBM by Catamore Enterprises Inc. was the topic of recent testimony by Warren C. Hume, IBM senior vice-president.

Although Catamore had called its witnesses previously, Hume took the stand after weeks of negotiating to obtain his appearance in court [CW, Feb. 12, March 19].

Judge Raymond J. Pettine, in outlining procedures with Thomas K. Christo, attorney for Catamore, indicated he would allow questions on the timing of the idea of unbundling and "if it can be shown that corporate management was contemplating an unbundling program and did not relay this to its salesmen along the line . . . it is relevant to the issue of fraud."

The judge declined, however, to permit Christo to call more IBM executives following the completion of Hume's testimony, noting that it was unlikely any of them would know any more than Hume or be able to be more specific.

The trial, now in its third month, centers around a suit filed by IBM against Catamore, a jewelry manufacturer, for unpaid bills of $68,453 and a countersuit for $15 million by Catamore charging IBM with "overselling" and breach of contract and warranty, fraud and intentional misrepresentation;

Much of Hume's testimony was devoted to lengthy explanations of the line and staff functions within IBM, most particularly the role of the Management Committee and the Management Review Committee (MRC).

Hume chose to classify the minutes of such committee meetings as "notes" rather than minutes, which he said brought to mind some type of formal review of the material by the participants.

Timing Questioned

After intensive interrogation about unbundling as referred to in minutes of the MRC, Hume admitted the concept of separate pricing was being formulated in October 1968.

During December 1968 the firm issued a press release indicating it planned some separate pricing. The release was made out of consideration for Securities and Exchange Commission guidelines, he added.

At that time, however, the MRC "had not decided what services would be separated," Hume said.

As an example, Hume noted the MRC was "considering, at that time, actually having a separate price for a customer engineer as part of separate pricing."

The committee decided not to do that, so "we were in the throes at that time of discussing all the various separate pricing of the services that were provided," he said.

Christo tried to elicit from Hume an admission that unbundling had been decided the previous fall, 1967, by reading minutes from February 28, 1969 that indicated: "Jones reminded the Management Committee that in the fall planning cycle it was agreed that the [Data Processing Group] was to work in $150 million into the 1970 plan."

But Hume explained this did not refer to plans made the previous fall.

Christo also attempted to obtain an admission that unbundling was in fact a price increase, but Hume steadfastly refused to categorize unbundling as such.

Reading from September 1970 minutes of the Management Committee, Christo asked Hume to explain the statement: "Hume had done some work indicating that revenue in 1970 resulting from New World [after unbundling] would be in excess of 3% rental adjustment last June."

Hume responded that it was a "forecast . . . . Now the facts are that I, that my forecast was lousy. We really didn't.

Hume labled as "forecast assumption" minutes indicating the committee in July 1969 expected an 8.9% increase from unbundling if all customers continued with full support and 6.9% if they only got installation support.

However, Hume said in explaining the existence of new services that were available after unbundling, "Those programs were made available to customers as part of the rental increase . . . included in the rent prior to unbundling."

EFTS Limitation Set With Ruling On Distance of Bank Terminals

(Continued from Page 1)

or other sites away from the bank office itself.

The amended ruling clarifies the conditions under which a national bank will be permitted to participate in statewide electronic funds transfer systems (EFTS), such as those contemplated in Nebraska and Missouri, the comptroller's office said.

If terminals are available to be shared by one or more local financial institutions and the national bank is willing to share its device at a reasonable cost, it will be permitted to do so, the comptroller's office explained. It added that a national bank may also use a terminal established by another organization or party and that it would be exempt from supervision by the comptroller when the terminals' only function is to allow shoppers to charge their bank accounts for purchases of goods and services.

National banks are required to give the comptroller 30 days notice prior to setting up terminals at remote locations. The notice must contain information about consumer protection procedures, including disclosure to consumers against wrongful or accidental disclosure of confidential information, the comptroller's office said.

Prior to these amendments, several state banks and other institutions had lodged objections against the original ruling, fearing increased competition from the larger banks using off-site terminals.

Correction

In the second part of the *Computerworld* poll of reader interests [CW, May 21], programmer/analysts ranked future IBM products after the 370 line eighth in interest and DP managers ranked the issue tenth. Electronic funds transfer systems and the Universal Product Code were ranked ninth by "others."

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Glaser Assails Present Licensing Efforts as 'Oppressive'

who have taken the examination to study and prepare themselves for it, and I'm certainly in favor of people acquiring some knowledge they may not previously have had," Glaser commented.

He added, though, "with all due respect to ICCP and to the holders of Certificates in Data Processing, and I am one, in my work the certificate doesn't mean anything."

While he contended the certificate "is not essential to professionalism," Glaser said "it is useful.

"Anything you can do to get people to improve their professional abilities is a good thing, and those who decry the certificate for lack of depth or coverage of certain subject matter might hold their tongues until they've come up with a certification program that's better."

He indicated one of the alternatives or appropriate additions to any certification program would be the development of self-assessment packages. Self-assessment revolves around the concept that individuals, in the privacy of their own homes or offices, would take tests in specific subject areas, submit these for grading and receive both guidance in those areas where they are weak and direction on where to go to correct such deficiencies.

Glaser noted the Association for Computing Machinery (ACM) is working in this area now. Afips has discussed self-assessment with ACM with the intent that the federation might be the appropriate body to administer such a program, he said, leaving the test design and content to the individual societies who are members of Afips.

No formal proposal has been made by the federation thus far, and Glaser indicated ICCP might also be an appropriate body to administer such a program.

Puzzling Problem

Acknowledging the support of industry in this area would be invaluable, Glaser said he continues to puzzle over how to motivate industry to encourage DP people to act in a professional manner.

"Perhaps industry needs to be scared a little bit," he suggested. "By emphasizing the importance of controlling the quality of systems to the satisfaction of those who audit them, we may convince industry directly of the need for competent people to work on its systems and indirectly, of the importance of spending a little more money on the development of their employees' capabilities," he explained.

He commended those universities who provide programs for practitioners. Concerned that schools had seriously neglected the practical side of DP, he said his discovery of programs at schools like the University of North Carolina, Harvard University and the University of Pennsylvania's Wharton School "were eye-openers to me."

Imbalanced Emphasis

But while he is "generally encouraged," Glaser said, "I have the strong feeling that heavy emphasis in most of the programs which turn out people called 'computer scientists' is still on the technology, with relatively little classroom time devoted to the human side of this work."

One of the reasons for this imbalance, he suggested, is that very few of the professors teaching the technology have the working experience necessary to enable them to teach their students an appreciation of the difficulties of "people problems."

Industry could, and has on a few occasions, helped in this respect by providing academicians with jobs on a sabbatical basis so they can acquire the practical, day-to-day knowledge they need, he added.

A second reason for the emphasis on technical subjects in university computer science programs is the tendency for the technically oriented person to scoff somewhat at nontechnical subjects, he noted. "I can remember when I was an undergraduate engineer working very hard on such nifty subjects as chemistry, differential equations and physics. I thought anyone who took economics or business law obviously wasn't smart enough to take engineering," Glaser said.

"I don't feel that way now, but I wish I had acquired an appreciation for other fields earlier," he added. "I might have if my teachers in college had made me aware of the fact that what I was getting was a pretty intense education in a very narrow field."

Though universities may legitimately argue they must concentrate on the theoretical and rely on the individual's working experience to provide the more pragmatic aspects of DP, Glaser stressed the need to give students some idea of the "people" elements involved "so they won't resent being managed when they leave the university.

"The wise professor will acknowledge to his students that what they learn in their formal four or six or however many years simply permits them to sit down at the table. It doesn't guarantee they're going to win any hands," he said.

Acpa Turns Member Of Licensing Crusade

(Continued from Page 1)

Those who can meet these requirements will be permitted to call themselves "licensed" or "professional" data processors.

People holding this rank for 10 years shall be called "master data processors," at the 20 year point they shall be called "grand masters," and at 30 years "they shall be called a drag on the business."

While all provisions of the proposed act will be entirely voluntary, "those who do not choose to voluntarily comply shall volunteer to be drowned in a bottomless bit bucket."

People in contempt of the act must surrender their coding sheets and pencils for two weeks. "Repeat offenders shall have their resumes permanently impounded and shall spend their days debugging uncommented assembler listings and their evenings filing away updates to the System Reference Library."

The Chicago/Acpa draft calls for a governmental board to oversee and enforce the provisions of the licensing act. "Membership on this select government agency shall be limited to nephews, brothers-in-law and those making a $50,000 political contribution to the nitwit of your choice," the draft concludes.

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DP Manager's Role in Corporate Hierarchy Solidifying

(Continued from Page 1)

sponsible to such people as the "Vice-President of Finance" or of "Business Services," the "Executive Vice-President," the "Director of Operations" or even the president of his corporation.

Young But Mobile

Just as the computer industry is young, so is the average age of the DP manager. Approximately 71% of the DP executives are between 30 and 44 and began in the industry during the last 15 years, Auerbach found. About 62% of these managers have been in DP for six to 16 years.

The study tended to support the much-publicized contention of a fairly high turnover rate in the industry; it discovered almost 67% of the DP managers surveyed have been with their present employer for less than eight years.

But, Auerbach noted, "a manager has a higher tenure period than the personnel below him, and the longer he is with a company the greater the likelihood he will stay with it."

Once managers have been with one organization for 14 years, the study found an increase in "years with the company."

The educational level of DP managers is increasing: almost 23% of those responding to the questionnaire have master's degrees. Auerbach cautioned, however, that educational level does not necessarily indicate the courses of study taken have been directed at some aspect of DP.

General business, computer sciences and accounting were rated as the chief skills needed by the DP manager by almost 70% of the respondents.

And, "while the survey did not go into specifics as to what 'computer sciences' might include," the DP managers seemed to attribute hardware/software knowledge, some programming, systems design, management techniques and a certain amount of formal training in these areas to the term.

But the study added that "computer science as understood by the DP manager and as referred to by the academic community may be somewhat different." The skills regarded by DP managers as least prominent – operations research, linear programming and statistics, for example – tend to be included by universities in their definition of computer science.

The research organization concluded the DP manager needs "either formal instruction in these subjects or should have staff assistance to provide such capabilities."

Despite the industry's reputation for "missed schedules, overrun budgets and personnel turnover," Auerbach noted "motivation" received the highest ranking of subjects for study by DP managers. "Hopefully, there is increasing recognition of the need to 'manage,' and the high rating for motivational skill reflects this growing awareness," the study said.

In response to its questions on how DP executives further their skills and knowledge, the survey showed managers generally advance through reading on their own.

These results led Auerbach to charge: "Too many companies view formal training – espcially on company time – as nonproductive. There is the unspoken attitude of 'That's what we hired you for' or 'If you're ambitious enough, then you'll learn on your own.'

"These attitudes can contribute both to underused computer power and to the turnover problem when the manager thinks that he can't keep abreast of industry developments in his present environment."

In evaluating their functions, the DP managers surveyed indicated their weakest area is long-range planning, while their greatest expertise lies in hardware/software selection, closely followed by budget determination and application priority decisions.

"In considering the various functions of the job, time utilization varies according to the number of 'hats' worn by the manager," the study said.

Managers of smaller organizations tend to participate more directly in systems design and staff supervision; larger organizations or DP staffs require the DP executives to spend more time in meetings with subordinate personnel to discuss planning, forecasting and budgeting and in interacting with managers of other departments.

Specifically, managers in larger organizations devote over 31% of their time in meetings with various personnel.

Finally, the Auerbach study predictably revealed the size of the DP staff increases with the size of the company employing the manager.

As Technology, McDonald's Collide

Students With IBM 370 Best Burger Bonanza

(Continued from Page 1)

had ready access to the computer and it was faster.

On the final day of the contest the students went to 90 McDonald's in the specified counties and started stuffing the entry boxes. Their computerized entries made up over one-third of the 3.4 million total number of entries.

McDonald's Not Pleased

McDonald's was not delighted with the students' high level of participation in the sweepstakes. Although Denker claimed their entries are legally valid, Ron Lopaty, president of the McDonald's Operator's Association of Southern California, said he feels "the students acted in complete contradiction to the American standards of fair play and sportsmanship."

The contest's purpose, he said, was "to give customers an opportunity, in a time of economic stress, to win free groceries and transportation. So you can understand our displeasure when their chances of winning were greatly reduced by the Cal Tech students using an unfair advantage of computerized entry blanks."

Part of the public agreed with him in letters and phone calls to both McDonald's and Cal Tech. The state's attorney general even received a petition signed by over two dozen southern California residents which said "the use of equipment at a state or federally funded college, university or institution for the pursuit of personal interest, not to mention cheating American consumers, is an absolute outrage."

As for Cal Tech, it has taken no position on the issue, claiming it was the students' private endeavor.

Lopaty said McDonald's has agreed "to honor as 100% valid all the Cal Tech students' 1.2 million computerized entries" and, in fairness to the other entrants, will hold a second drawing in which all the computerized entries will be excluded and duplicate prizes of any won by the students will be awarded again.

For the students, the McDonald's caper, as they call the affair, has paid off. They have already been notified they've won a Datsun 710 station wagon, a year's free supply of groceries and innumerable $5 gift certificates.

"Part of the loot will be used to finance improvements in Page House, our residence here at Cal Tech," Denker said. "The rest will be donated to charity."

Denker was dismayed at the restaurant chain's reaction to the incident, saying he doesn't feel they violated American standards of fair play.

"Just because it is unexpected doesn't mean it's unfair," he explained. "We feel that by accepting the challenge to enter as often as you wish, we have acted in accordance with the best ideals of American sportsmanship."

There are those who agree with him, and Cal Tech garnered a prize of its own from one of them. The Burger King chain of restaurants, McDonald's arch rival, has awarded $3,000 to the school to set up a "John Denker Scholarship" in honor of the student who masterminded the scheme.

Dartmouth Announces Art Contest Winners

HANOVER, N.H. – A few young Turks trying to introduce new methods to the art world were recently given recognition for their efforts in Dartmouth College's seventh annual computer art contest.

The first prize winner of this year's contest was James Browning, a freshman, who won $75 for an audio-visual presentation entitled "WHE" and tied for second place and a $50 award with an untitled entry depicting an interacting flow of colors.

The other second-place winner was sophomore Robert B. Clyman with a geometric design entitled "Blossoms." Lynn Brooks, a junior, entered a stylized presentation called "Ponies" that took third place. She also received an honorable mention for "Owls."

The idea for the contest was introduced in 1968 because professors at the school's Kiewit Computation Center wanted to encourage students in fun aspects of computers as well as mathematical applications. As Jann Balton, documents manager at the center, said, "We wanted them to use their talents for something other than grunt labor."

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Though It's a Valuable Tool

Simulation Should Be Last Resort in CPE Undertaking

By Tom Tryggestad
Special to Computerworld

It has often been said, and rightly so, that simulation should be resorted to only when there is no other way to get an answer.

This is because a simulation study is often time-consuming, taking several months to complete; can be expensive in terms of the manpower required (and often entails the leasing of proprietary simulation language); and, when finished, may still contain a 10% to 25% error factor.

Focus On Performance

Obviously, other less expensive and equally reliable alternatives should be explored prior to engaging in a full-scale simulation study. These alternatives include such things as hardware/software monitoring, statistical analysis, benchmarking and the use of other analytical tools.

However, questions always arise that cannot be satisfactorily answered any other way. Experience has shown these difficult questions can and do occur throughout the life cycle of a computer system. The figure shown describes the stages in the life of a typical computer system.

Types of Questions

This article centers on the types of questions simulation can aid in answering as those questions occur throughout the life of a computer system.

The word simulation can be used to describe a wide variety of activity – from a "quick and dirty" effort to a multiple man-year study. As used here, simulation refers to that sort of fairly detailed study that usually takes 2 to 6 months and requires the use of a proprietary simulation language.

The typical study involves the following steps: (1) building a model of the computer system at some point in its life cycle; (2) changing the model to reflect certain desired changes in the actual system; (3) analyzing the output from the simulation runs; and (4) taking the action indicated by the results of the simulation.

There are, of course, exceptions to this procedure, but this is the basic simulation study process.

Conceptual Phase

The conceptual phase can be defined roughly as the period when someone gets an idea that something needs to be done about his computer support. Such ideas usually fall into two major categories:

- The need for an entirely new computer system (e.g., computerization of a manual function, consolidation of several current, outmoded installations or, possibly, decentralization of various functions).

The problem here is that no one has any concrete idea what the eventual system will look like.

- The need for modifications to an existing system or systems (e.g., new applications have brought about the need for an improvement in throughput capability, turnaround requirements have changed, real-time response needs to be improved, etc.).

The required modifications may turn out to be such things as new peripherals or additional processors, or it may be that an entirely new computer system is required.

Little can be done in preparing to conduct a simulation study in the conceptual phase, except perhaps to begin to recognize the need for simulation and to begin to collect the necessary data. More specific information is required before actual simulation activity can begin.

Identification of the need for a quantitative study and a recognition of the potential of simulation is, however, important at this stage.

Requirements Phase

The requirments phase may be defined as the period during which specific needs are identified and quantified to the point that acquisition action can begin. The result of this phase is usually the release of a Request for Proposal (RFP) document detailing the requirements and the expected performance characteristics of the items to be bid.

Simulation can aid a requirements study by providing an initial estimate of the size, cost and complexity of the system required to support the needs identified. If any type of benchmark is to be involved in the selection process, simulation is particularly useful in developing the benchmark package.

It helps to ensure that the benchmark is representative and that the systems likely to be bid are capable of handling the workload. More to the point, it is a way of finding out whether the size and capacity of the system required are within budget limitations.

Some Examples

Some examples of the use of simulation in the requirements phase: In order to simulate a computer system where no computer system currently exists, it is necessary to gather as much information as possible on what the system will eventually look like.

It usually is possible to define both the number and size of the master files and the types of processing to be done against these files. Once this is accomplished, it is possible to model the system on a gross level to determine how large and expensive it will be and, through the model, define specifications for a system that is matched to its intended workload.

The process would be somewhat different when the consolidation of several DP centers is being considered. The first step here would be to model the workload of each of the various centers. Combining the workload models will determine the "size" of the computer required to handle the combined workload and whether the consolidation is feasible.

In dealing with an existing system which needs to be improved, the most crucial questions in the requirements phase are whether a modification to the existing system will provide the necessary improvement or whether an upgrade to a larger system is required.

In this situation, it is necessary to model the system in its current state and then to begin to modify the configuration (by adding channels, more core, faster peripherals, etc.) to determine if these changes will produce the desired results. If they do not, a complete upgrade to a larger, faster computer is probably indicated.

Acquisition Phase

The acquisition phase may be defined as that period during which it is decided which of the various alternatives is most appropriate. The evaluation process follows the same general pattern, whether dealing with a new system or with modifications to an existing system.

Using models developed in the requirements phase (or new models), the various alternatives (or proposals) are simulated to determine which is most appropriate.

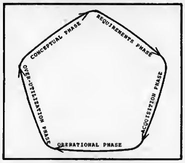
When the selection process includes a benchmark, it is usual to simulate the benchmark runs to check the validity of, or calibrate, the simulation model and to use this model as a base for simulating an expanded workload. The benchmark usually represents some point in the expected growth of the system, but often not the peak.

By using simulation, the peak workload can be imposed on various configurations to determine which will best handle the future workload.

On the surface, little difference may appear between the activity described here and that in the requirements phase. While the requirements phase dealt with the preparation for making changes or acquiring a system, this phase deals with an analysis of the actual alternatives that present themselves.

Operational Phase

During the next phase, the operational phase, the system is operational and supports the needs of the organization in an adequate fashion. In this phase, the emphasis is changed from acquiring the best system possible to trying to get the most out of the system at hand. This is often referred to as "system tuning."



Syatem Life Cycle

The use of all computer performance evaluation (CPE) tools in this stage is appropriate. In fact, it is quite likely that tools other than simulation will do the job in a more cost-effective manner.

However, simulation can be used very effectively for system tuning, particularly if models of the system already exist or can be generated easily. Again, the general rule is that simulation should not be applied unless an answer cannot be arrived at through other less costly means.

One very significant point to remember, however, is that other CPE tools (notably hardware and software monitors) can often quickly identify problem areas or potential problem areas.

Since the goal of the system tuning is to optimize throughput (or whatever is the critical aspect of the system under study), identification of potential bottlenecks (channels, disk units, CPU speed, etc.) is very important. Once these bottlenecks are identified, ways of removing them are often obvious. Remedial action can then be undertaken.

Sometimes, however, neither solution to a bottleneck problem nor the effects of certain changes can be easily determined. Here, the use of simulation is called for again.

Complements Measurement

This is not meant to downgrade the usefulness of monitors as such, but only to indicate that they are gatherers of data and do not provide the user the capability of trying alternatives without making actual system changes. Simulation provides this capability and can be very effective in dealing with complex problems. It is a complement to measurement, rather than a substitute for it.

Again, some examples may be of interest. All systems seem to have at least one program that can be considered a "problem program" – whether it runs a long time, aborts frequently, uses up all available resources or whatever.

The operational phase is a very good time to analyze this program by measuring it, modeling it, making changes to the model to reflect some possible coding changes or data file reallocations and checking its new runtime and resource utilization figures.

Other operational problems simulation can help solve are the optimization of multiprogramming scheduling, the balancing of disk and tape channel utilization and the improvement of response to real-time transaction workloads.

The long-range benefits of beginning performance evaluation work in this phase are considerable. The most important is the forestalling of the next phase – overutilization.

Overutilization Phase

During this phase, increasing demands on existing system resources prevent work from being done in a timely manner. There are numerous causes of overutilization: new applications, large volumes, more real-time transactions, more work in general.

The problems to be dealth with are those mentioned in the operational phase. The only difference now is that the analysis is no longer optional. The use of all CPE tools and techniques is necessary.

The methodology involved is nearly the same as that for the operational phase. A simulation model of the system it its current state is developed. The output from the simulation is analyzed to determine probable problem areas and to identify possible alternative approaches to increase throughput, reduce turnaround, etc. Once these problem areas are identified, the process can begin anew.

Furthermore . . .

This discussion has dealt primarily with the use of the simulation tool in CPE. It is crucial to point out that a considerable amount of analysis, both before and after simulation, must take place. The presimulation data gathering, if done properly, is beneficial and educational in and of itself.

The investigation required to produce the desired data will usually provide the simulation team not only with a good idea of the nature of the problem, but also with a good idea of the nature of the solution.

No Surprise

In fact, with few exceptions, the simulation results in a properly conducted simulation study should never be a complete surprise. They should be, and usually are, a quantification of something already anticipated.

It is not a matter of putting together a mass of data and waiting for the simulation to provide all the answers. It is a long, detailed process involving very careful analysis throughout. Those who expect instant answers or who use simulation to attain them are likely to be disappointed.

Beyond Simulation

This idea can be extened beyond simulation, to CPE in general. It is important to realize performance evaluation should be more a "state of mind" than a practical art. The idea of getting the best performance possible from a system must be ingrained into everyone concerned with a system before it is installed and before any programs are written.

CPE is usually used as a "stop gap" measure after a problem or potential problem is identified. It is far better to have a continual performance evaluation function which uses the CPE tools on a regular basis. This will help eliminate the operational crises that usually generate a simulation or CPE study and will provide for overall efficient utilization of computer resources.

Tryggestad is with the Federal Computer Performance Evaluation and Simulation Center.

Measurement Role to Predict, Not Confirm, Problems

By Nancy French
Of the CW Staff

CLEVELAND – To be effective, performance measurement should be conducted on a continuous basis and used to predict problems, not merely confirm them, said Ray Hitti, computing facilities consultant for Standard Oil of Ohio (Sohio), in a recent interview here.

Focus on Performance

"Over the years, installations that measured performance at all actually did so only when the resources threatened to run out – to determine the correct fix," Hitti explained.

But in real-time systems, solutions are not always a matter of additional equipment. They often involve more subtle changes – a slight "retuning of the software or the hardware," Hitti said.

A man whose involvement in measurement spans seven years, Hitti is concerned with the performance of several real-time interactive systems, including one used to verify the status of Sohio's gasoline credit card holders and another for heating oil delivery.

In real-time systems, performance should be measured in terms of service, and "what is service, really, but response time," Hitti explained.

"In the DP department" where you know how much the system is actually doing, "it's easy to take a kind of global view of response time," but people posted at terminals to answer telephone inquiries don't see it that way. "Service must be measured from the standpoint of the user," he said, not the DP department.

Three Factors

The answer is to consider three factors simultaneously, Hitti said:

- Service.
- Load.
- Utilization of resources.

If you measure your system's activity and "find 50% utilization, how do you know if that is good or wasteful?" he asked. On the other hand, if you link utilization of resources with load and service and consider the three simultaneously, you begin to develop an idea of your real performance.

One of the biggest problems affecting response time is "contention" in the system. Often the equipment is adequate, but contention can be caused by changes in customer loading, he said.

This is more important on a real-time system, where you are dealing with transactions that are unique in a given moment and difficult to recapture as compared with a batch environment where activities can be repeated in another time frame.

CW Photo by N. French

Ray Hitti

Measuring response time at individual terminals is one of the most difficult measurement problems you can attempt, Hitti said.

Transaction time must be broken down into functional areas.

- Time needed to transmit a query.
- Time needed to process a query.
- Time needed to transmit the answer.

This enables you to measure resources in various different equipment categories such as telephone line, front end, mainframe, channels and files, he explained.

Oil Delivery System

Sohio's heating oil delivery system performs such functions as on-line order entry, invoice preparation and truck dispatching in response to customer telephone calls.

At the same time, it provides regular delivery service at specified time intervals. The hardware consists of an IBM 370/145 with a Univac 3760 front end and approximately 75 Univac 100 CRTs and a couple of printers.

Sohio measures its systems with software monitors – and simply, according to Hitti – by "clocking events as they occur, using a soft clock and software we wrote ourselves," he said.

"Most computers are equipped with clocks," he said, "so if you fabricate some software at the point you wish to measure and then ask the clock to record the subject of the query and the event itself in the disk file, you have, in effect, time-stamped each event.

"Then it's simply a matter of subtracting the difference to get the length of time the event took. Differences are posted by line and by console and stored in a disk file you don't need for any other

(Continued on Page 7)

Function a Factor

By a CW Staff Writer

CLEVELAND – When evaluating response time, DP managers should not be overly influenced by the psychological viewpoint of terminal operators as opposed to studying the business function for which the system is being used, according to Ray Hitti, computing facilities consultant, Standard Oil of Ohio (Sohio).

Good response time is very subjective. What might be considered poor for one application could be perfectly adequate for another.

Hitti pointed out that faster response time might be more important for an operator accessing the system to answer telephone inquiries than for someone who was merely processing customer bills.

"Better response time costs a lot of money," and if you're considering upgrading your system, "your first step should be a basic operations research (OR) study," Hitti advised.

Too often, we tend to study the information system rather than the business system, and "overkill" our application, he pointed out.

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In Conducting Company's Business

Failure to Use Systems Predicted as Future Negligence

By Edward J. Bride
Of the CW Staff

ANAHEIM, Calif. – The time is coming when failure to use computers may be interpreted as negligence in conducting a company's business, according to Susan Nycom, an attorney and researcher in computers.

Addressing the topic of "Noncontractual Responsibilities" of computer users at a recent National Computer Conference panel session here, Nycom said that not using computers where they have proven to be effective may expose companies to lawsuits for negligence.

On the other hand, excessive reliance on computers has already resulted in liability for negligence, she reminded her audience. She cited one example of a consumer who had his automobile repossessed because of what a company called a "computer error" in its billing system.

The legal field is one area that is still evolving along with the rest of computer technology, other participants agreed.

For example, the Supreme Court will again review whether computer programs can be patented [CW, May 21], noted session chairman Robert P. Bigelow, editor of *Computer Law and Tax Report*.

As for other legal measures for protecting proprietary software, Bigelow noted that nearly 1,000 computer programs have been copyrighted, and several are protected by trade secret law.

Some software vendors, he added, have determined that legal protection is in fact unnecessary. Since package sales often include a degree of maintenance and improvements, customers find it cheaper to buy rather than pilfer programs, thereby obtaining the benefits of improvements and corrections.

Battling Red Tape

Software vendors who have found government red tape excessive should familiarize themselves with regulations before submitting bids and throwing up their hands in despair after failing to succeed, advised Terry Miller of Government Sales Consultants, Inc.

Miller said the bidding procedure need not be as complicated as many vendors claim, and it certainly is not as complicated as the design and maintenance of programs and equipment.

He disputed general impressions of some vendors that the bidding process is too complicated or, as others have expressed it, "The only thing worse than having a government contract is not having a government contract."

The contracting process for nongovernment users also entered the discussion, with attorney Richard L. Bernacchi reminding users about two key points:

- Verbal promises often are forgotten or ignored, and all expectations from a vendor must be committed to writing.
- Always define terms so supplier and customer have the same interpretation of promises. Definitions should be part of any contract, he said.

Bernacchi also noted that the negotiation process is a team effort among user, lawyer and – possibly – an outside consultant. This team effort must begin early in the system selection process, not just when the contract has been presented by the vendor, he said.

Carter Asks DP Help for Peace

ANAHEIM, Calif. – As part of a repeated theme of applying computer technology to the public good, ex-Governor of Georgia, Jimmy Carter called on his audience in a special session at the recent NCC to help structure the transition to a peace-based economy.

Noting that former President Nixon had "severed the long-standing relationship between the White House decision–making process and the scientific community," Carter said scientists and technicians are "much better able to back off to a vantage point of proper judgment."

Carter, himself an announced presidential candidate, also said this is a time of searching for the "proper relationship between scientists and political decision makers."

Commenting on government secrecy, he said Washington should take a lesson from the scientific community, claiming "minimum secrecy contributes to maximum improvement."

Role of Measurement To Predict Problems

(Continued from Page 6)

purpose," he said.

In its credit card verification system, measurement is a lot simpler, since all the terminals are connected directly rather than by telephone lines, Hitti said.

"We use IBM's Customer Information Control System (CICS) Performance Analyzer to do basically the same type of monitoring we built into the other system.

"It helps us decide what kind of buffers there are within CICS and what the transactions are by type and volume so you can tell exactly what it is that's loading the system," Hitti explained.

Measurement might also tell you that you are getting too many queries against a particular spindle of a file.

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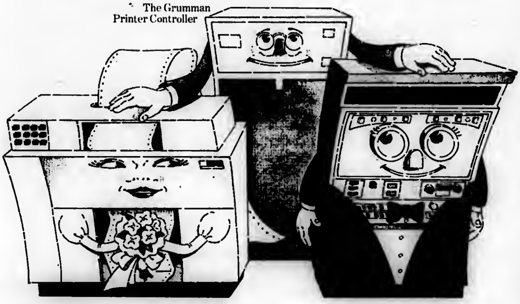

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Calendar

June 26-27, Philadelphia – Third Annual Conference of the EDP Auditors Association. Contact: Herbert Zeruld, Laventhol & Horwath, 1845 Walnut St., 19103.

June 29-July 2, Atlanta – Info/Expo '75, sponsored by the Data Processing Management Association (DPMA). Contact: Martin H. Bowerman, Director of Programs and Services, DPMA, International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

Aug. 5-7, Portland-Gorham, Maine – Summer 1975 Conference of the Association for the Development of Computer-Based Instructional Systems. Contact: Dr. Martin Kamp, Information Systems, San Francisco, 94143.

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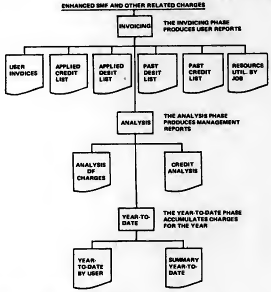

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Keeping Up-To-Date Topic Of DPMA Seminar Series

A series of eight professional development seminars sponsored by the Data Processing Management Association (DPMA) will be held in Washington, D.C. and New York City throughout June.

The seminars will be directed toward the theme "Your Future and Computing: How Not to Get Out-of-Date," and the subjects have been chosen to help both DP managers and technologists as well as users of computer services.

Topics covered will include computer system auditing, privacy and security; data communication and networking of computers; project management of computer systems; data base management – theory and practice; structured programming methodology; computer performance evaluation; and planning for tomorrow's computer technology.

All seminars will last two days. The first set of eight begin in Washington, D.C. June 9 and end June 12. New York's set begins June 17 and ends June 20. For further information, contact the U.S. Professional Development Institute, 1408 Chain Bridge Road, McLean, Va. 22101.

University Workshops to Examine Medicine and Automation Theme

NEW BRUNSWICK, N.J. – "Knowledge-Based Systems in Biomedicine" is the theme of the first in what is hoped to be a series of workshops on "Artificial Intelligence in Medicine" scheduled for June 14-17 at Rutgers University.

The series is designed to promote insight into existing and potential systems that apply methods of artificial intelligence to problems of medical research and health care. The first workshop will center around discussion and demonstration of existing computer-based systems for medical consultation.

For further information, contact Dr. Saul Amarel, Department of Computer Science, Livingston College, Rutgers University, 08903.

NCC '76 Papers, Ideas Solicited

MONTVALE, N.J. – The 1976 National Computer Conference (NCC) is hanging out a "Help Wanted" sign for papers and session proposals for the conference, scheduled June 7-10 in New York City.

According to Conference General Chairman Dr. Carl Hammer, "We want contributions from 200 authors with topics covering every area of computer science, data handling, DP applications and information processing.

"If you can write with authority and conviction on a computer-related topic, or if you have a bright new idea on a potential session or program area, we'd like to hear from you as soon as possible."

Only unpublished papers are solicited, with total length not exceeding 5,000 words, and each paper must include an abstract of not over 200 words. Six copies of a manuscript must be submitted by January 5 to Dr. Stanley Winkler, IBM Corp., 18100 Frederick Pike, Gaithersburg, Md. 20760.

Compcon Spring '76 Chairman Appointed

SILVER SPRING, Md. – Dr. Sidney Fernbach, head of the Computation Department at Lawrence Livermore Laboratory, has been appointed general chairman of Compcon Spring '76, the 12th IEEE Computer Society International Conference scheduled for Feb. 24-26 in San Francisco.

Dr. Fernbach is an editor of the *Journal of Computational Physics* and *Methods in Computational Physics* and a fellow of the American Physical Society.

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Long-Range Planning Reflects Company's Credibility

By Nancy French
Of the CW Staff

ANAHEIM, Calif. – The approach an organization takes to management information system planning is a reflection on the credibility and capability of the organization itself, its industry characteristics and the maturity, sophistication and enthusiasm of the company, John V. Soden, a management analyst with McKinsey & Co., Inc., said here recently.

A recent McKinsey study of a cross-section of companies with DP budgets greater than $10 million tended to have five primary objectives in long-range planning:

- Increasing communication between the DP department, users and top management.
- Improving requirements forecasting, allocation of resources and short-term decision making.
- Identifying opportunities for improvement and cost reduction.
- Identifying computer applications with higher payout and canceling marginal efforts.
- Improving the company's understanding and awareness of the DP department.

While all surveyed ranked these objectives, as top five priorities, only half the participants in the study actually said they achieved their objectives, and Soden attributed this to a failure to develop a long-range planning document with information such as a summary of the DP organization's strengths and weaknesses, alternative strategy definitions and evaluations and a projection of the host organization's future industry environment.

Understandable Objections

"Objections to including a summary of the DP department's strength and weaknesses are understandable," he said. "However, an honest introspective analysis of the current status of the DP group is necessary both to identify areas in which improvement is needed and to assess the resources available for undertaking any future plans," Soden said.

"A projection of the host organization's future industry environment was usually left out because the company itself had not developed or documented one, and the DP group either did not want to or did not feel capable of doing so," he added.

Since one of the planning objectives was to gain a better understanding of the overall organization, this seems rather paradoxical and may explain why that objective was not achieved to a higher degree, he said.

One of the most telling findings regarding the long-range planning documentation, however, was that the study's participants who agreed they should include information such as return on investment or risk estimates for potential projects failed to do so, revealing that even mature organizations permit a rather large gap between recognized standards of planning and actually practice, he pointed out.

Important Distinction

Soden stressed the importance of making a distinction between the "DP strategy statement" and the "DP plan." While the two are interrelated, the strategy statement "defines the objectives and policies" of the DP organization while the plan "lays out the actions needed to achieve those objectives," he said.

"Few participants made this distinction and explicitly created a DP strategy statement as part of their planning process. This appears to be one of the major factors that inhibited achievement of planning objectives," he said.

Calling the DP strategy statement the key communications vehicle between DP and top management, Soden pointed out that this document permits top management to participate in directing the DP effort to best suit the company's needs while, at the same time, it helps the DP manager to establish himself as a member of the management team.

Going a step farther, Soden explained that within the general strategy development framework there are at least two modes in which DP can operate: "reactive" and "proactive."

In the reactive mode, top management develops an overall companywide strategy and DP management reacts to it by developing a proposed DP strategy to support it.

In the proactive mode, on the other hand, DP strategy and company strategy are developed simultaneously and, in this case, DP plans can influence the company's strategy formation to allow it to take the best possible advantage of computing capabilities and available resources, he explained.

Planning Evolution

The young DP organization might not be able to do any more than think ahead one year at a time, build a good DP foundation and cultivate a core group of users, he said.

As time goes on and day-to-day problems become more manageable, the department may take a kind of "medium-term view," according to Soden, and begin to expand its user group, determine current user needs and filter user requests to enhance the return on investment for DP activities.

"This may involve examining the company's financial and operating data to identify those areas in which DP could have the greatest impact on the company's current and future success," he said.

The medium-term plan usually consists of a multiyear system development schedule and budget extrapolation to support it, he said.

Finally, long-term plans are designed to "influence the future development of the company and involve aligning DP activities with the long-term plans of the company at large." It means "identifying and preparing for user needs that are likely to develop in the future."

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MINICOMPUTER M

MODERN DATA's annual study of the minicomputer, microprocessor and miniperipheral market is now available.

This fourth annual survey is the most exhaustive and comprehensive study ever undertaken in this field and represents a research investment in excess of $50,000.

Questionnaires from over 5,000 minicomputer users at 3,500 sites throughout North America were received and analyzed.

The survey participants reported having 27,000 minis in place as of January 1, 1975 – accounting for nearly one-quarter of the total installed base in North America.

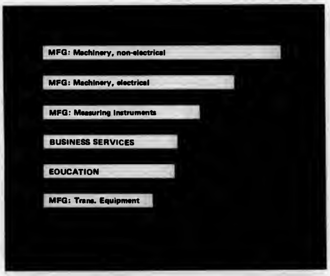
The complete survey report forecasts total 1975 minicomputer and miniperipheral shipments, and features detailed cross-tabulations, analyses, and profiles for each of the major vendors of minis, micros, and peripherals.

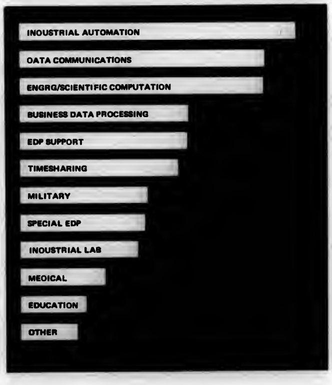
The survey respondents took delivery on more than 18,000 minicomputers in 1974 at a reported value of nearly $400 million (including peripherals). The respondents' purchase plans for 1975 include larger quantities and higher expenditures.

MICROPROCESSORS

Over one-third of the 3,500 organizations represented in the survey reported an active interest in microprocessors and/or microcomputers. Of the organizations building products with micros, 48% are still in R&D, 31% are still designing, and 21% are now producing. The firms planning to buy micros indicated they will use them . . .

- Instead of hard-wired logic (45%)
- Instead of minicomputers (19%)
- For new applications (36%)
(not previously implemented with electronics)





For Users With Varying Needs

Careful Design of Data Base Systems Seen Essential

By Nancy French
Of the CW Staff

ANAHEIM, Calif. – A poorly designed data base system can seriously hamper managers whose information needs are changing rapidly, and restructuring can be extremely costly in dollars and man-years, John J. Donovan, professor at MIT's Sloan Business School, said at a National Computer Conference technical session here recently.

With the change factor as well as the relatively wide range of computer skills of the system's potential users in mind, MIT designers built the New England Energy Management Information System (Neemis) to serve a hierarchy of users. Officials accessing the data could do so without having to know how it was organized, he said.

"Users would see information as relational – or as a matrix of values, with each column a domain, and each row an entry," he explained.

Generalized System

This generalized management information system was to enable users to store, validate, retrieve, interpret and analyze data. This data, then, would enable decision makers to construct and apply models using that data to facilitate energy analysis and decision making.

"The objectives could not have been met by an accounting system, for example, which operates on a well-defined set of data in a well-defined way," he said. "Neither data nor operations are subject to rapid alterations."

Furthermore, the data is relatively "clean" and from consistent, high-quality sources, he pointed out, adding that "he didn't know what dirty data was" before becoming involved with this project.

Users were defined as four types – the nontechnical state administrative officer, for example, whose objective was to get answers to questions and reports.

Second was the well-trained user who was perhaps a specialist within the state energy office trained in the use of the system. He might want modeling facilities, with access through relational query language.

Third was the researcher – perhaps an economist with some computer background – who would wish to access the system to build a model for special study as well as data definition capability.

Finally was the systems analyst/programmer, who might wish to add a new table to the system or change the protection rights on an existing data series, Donovan said.

Among the types of problems the system was designed to provide answers for were "Why, at the height of the energy crisis, was the average number of miles per gallon of cars being purchased falling rather than rising?" Donovan said.

Through use of IBM's Virtual Machine Facility 370 (VM 370) system, Neemis was able to interface different virtual machines in every state, Donovan explained.

Basic User Requirements

In the multiple-user environment, the basic requirements for a user are to send a command to Neemis, receive a reply that may be in a number of forms ranging from report, single answer or return code, for example, and then either display the reply or perform further operations on it.

These requirements were satisfied by using a single virtual machine that contained the Neemis data base and command processor. Each user had his own virtual machine and communicated with the Neemis machine through use of virtual card punches and shared query/reply files, he explained.

Federal Funds Needed For CAI Development

ANAHEIM, Calif. – Early Federal Government support for computer-aided instruction (CAI) has plummeted in recent years, and new programs must be sustained by local funds, said Robert Scanlon of Research for Better Schools in Philadelphia.

Scanlon said getting funds for development of programs has become a kind of Catch-22 situation. According to a recent study by Educational Testing Service, he said, effectiveness of computer-aided instruction can be proven through "high-quality demonstration," which "depends on good educational materials."

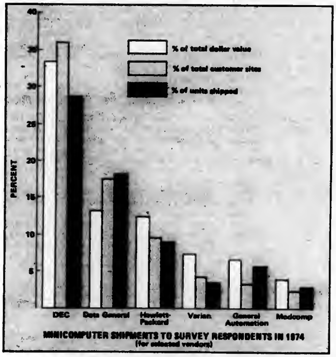
Good materials, however, depend on "the kind of people who are knowledgeable in theories and methods of instructions. These good people can only be obtained by giving such professionals recognition and economic incentives, and these, in turn, require evidence of the value of the task, a product and distribution and marketing system." This cycle can only be broken by a large investment of federal funds," he said.

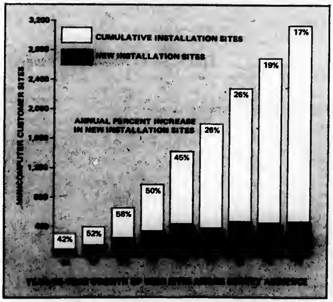
Scanlon called for renewed effort and investment in the potential of computers used for this purpose.

Educational futurists disagree about the future of CAI. With decreasing school enrollments and increasing costs of education, it is inevitable a confrontation over costly computer acquisition will arise between taxpayers and school administrators. In making these investments, taxpayers will want to emphasize educational productivity, he said.

Computer applications suffer from lack of national demonstrations, he said.

ARKET SURVEY / 1975





The respondents reported plans to buy 193,000 microprocessors in 1975. The applications, and the vendors being considered are tabulated in the full report.

MINIPERIPHERALS

The report charts the percent share of 1975 orders for all the major vendors of . . .

- Magnetic tape transports
- Cassette transports
- Disk drives
- Floppy disks
- Line printers
- Teleprinters
- Digital plotters
- Paper tape units
- A to D, D to A converters
- Add-on memories

INSTALLED BASE

This year's report features an analysis of the installed population of minicomputers based on SIC codes. Also featured are analyses of the installed base by make and model numbers, applications, OEM/end user mix, and geographic distribution.

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Editorial

Patent Medicine Needed

The U.S. Supreme Court has done the right thing in agreeing to review the Court of Customs and Patent Appeals' decision on the patentability of Thomas R. Johnston's system of financial recordkeeping [CW, May 14 & 21].

The implied willingness of the high court to consider the broader question of software patentability in general is even more encouraging.

A patent on the particular system under review seems to be rather inappropriate. Don Leavitt, CW software editor, recalls writing a program that used an added digit in the Micr-encoded strip on checks and other documents to separate the documents, and the values they represented, by application. That's apparently the essential logic of Johnston's program.

But Leavitt's work was 10 years ago, in one of the first IBM 360/1419 Micr reader/sorter installations in the Boston area. Viewing himself as an average programmer, he argues that if he could develop such an approach, it couldn't really be unique or unobvious – basic prerequisites for a patent in any case.

But there are certainly some software systems that deserve special protection for the innovators that created them. Ideas as such are apparently not patentable, but the dodge of posing the programming logic in the guise of "apparatus" or a "machine," as Johnston did in his appeal, is clumsy at best.

In 1972, the high court rejected the pleas of inventors Benson and Tabbott to grant a patent on their program, finding the routine being presented was "essentially a series of mathematical calculations or mental steps" not suitable for protection.

But Justice William O. Douglas recognized the possibility of misinterpretation of that particular finding: "It is said the decision precludes a patent for any program servicing a computer. We do not so hold."

The court seemed to look then to Congress for clarification on the rules that perhaps should be followed to allow patenting of software. Clearly Congress has had a multitude of other more pressing concerns since then, and the issue still hangs in abeyance.

The software industry itself is split on the issue of patentability. Some feel strongly that conventional patent protection is fully justified. Others don't necessarily disagree, but note the mere act of applying for a patent puts all the innovator's code on the public record.

Use of even parts of the code thus exposed would be tempting to the unscrupulous and difficult for the patent holder to identify, gain compensation for or halt on the basis of patent infringement.

Without – for now – any clear-cut picture of what the solution should be, we nonetheless urge the Supreme Court to spend enough time on the question of patents for software so it will provide comprehensive and comprehensible guidelines for all parties concerned – developers, software vendors and users.

'Your Honor, It Just Happens That Fortune Smiles on Some Businesses And Not on Others . . .

Letters to the Editor

Where It's Smart to Start

While I agree with much of what Lou Mills had to say in "Program Rework Should Expedite Most Used Routines" [CW, May 21], I would like to point out something which he apparently missed.

Programmers are prone to follow the most logical method of doing something, and the most logical method of comparing a data name to an increasing value is by starting with the lowest number and proceeding upward.

I am not advocating the use of the inefficient logical method over the use of the efficient method. If, however, the analyst had made an estimation of frequency *before* assigning numbers to card types, he could have assigned the lowest value to the most frequently occurring type, the next value to the second most frequently occurring type, etc. This would have resulted in efficient logic which would have been easy to follow.

Jerrold L. Dykstra

Oak Lawn, Ill.

Right to Bill Not Necessary

In the May 14 Taylor Report, Alan Taylor made the ludicrous assertion that, for proper payments of an amount claimed as due, a doctor must have "either established a right to bill both the patient and the insurance company or ordered the insurance company to pay the patient directly."

Such a statement shows a gross lack of understanding of billing in general and the health care industry in particular. Since when must a *right* be established to bill anyone for services duly rendered?

Moreover, since the insurance policy is an agreement between the patient and the insurance carrier, why must the insurance company be ordered to pay the patient directly? The fact is, the doctor is performing a service in completing the patient's insurance claim form.

Once the doctor has fulfilled his obligation to provide the patient with an itemized statement of charges to qualify the insurance claim form, he then has a right to expect payment on his bill.

To further display his ignorance of the practical aspects of medical economics, Taylor questioned "whether a system designer or a service that specializes in putting out these direct bills should permit the doctors to fail to give them the necessary Information to do the job properly."

A service bureau can suggest and even strongly recommend a particular course of action with regard to patient billing based on their experience, but to tell a client or potential client doctor that it will not permit him to bill his patients using his data in a way that violates no other regulation or code of ethics is both arrogant and business suicide.

Donald R. Anderson
Vice-President, Product Development
Science Dynamics Corp.
Torrance, Calif.

Fortunes Small But Numbers Many

I was pleased to see Carl Riecken's letter in the May 14 issue. We too are a small business with two stores interested in computers. This month we are converting to an accounts receivable package developed in-house and will be developing an inventory system for our disk-based Interdata 7/16.

The computer power is available now at a price a smaller business can afford, but what is really needed is in the area to which Riecken referred – point-of-sale for small retailers. There is a huge potential for equipment that can generate human-readable tags as a response to posting receipt of goods, perform the reading and storing of information at the checkout and report back to the CPU.

Replacing keypunch equipment goes a long way at cutting time and mistakes involved with data entry, but the workable system of the near future will have to include such tag equipment for the small user.

Perhaps *Computerworld* could start a small section dealing specifically with the small business user. We can't spend fortunes on equipment, but our numbers are many.

Wayne Braun

Braun's Apparel
Rapid City, S.D.

Grosch Owes Apology to Readers

Herb Grosch owes the readers an apology for believing we are dumb enough to believe he was serious in his remarks on Stephen Wright's *Datamation* letter [CW, May 7].

The point is not that we shouldn't have stored programs, but that it is just plain ignorant to continue to design, program and purchase machines that can stupidly operate on their own instruction streams and not notice the idiocy of so doing.

In the same issue, it was about time someone started telling the public how dangerous and ineffectual the Federal Aviation Administration (FAA) bureaucracy can be to air travel.

I have some old draft papers that blow gaping holes in the sizing and processing methods used by the FAA.

M.J. Viehman

San Diego, Calif.

(Other commentaries on Pages 13 and 14.)

Reader Commentary

IBM Privacy Principles Fail to Pass Practical Test

By Larry Nye
Special to Computerworld

In July 1974, IBM published its four privacy principles, stating individuals should:

- Have access to information about themselves and know how that information is used.
- Be able to correct or amend their records.
- Be able to prevent that information from being improperly disclosed.
- Understand the safeguards being used to ensure the data to be reliable and safe from misuse.

This bold, concise IBM statement on a potentially explosive issue was, in part, the result of "Project Safe" (Secure Automated Facility Environment) which had consumed $2 million of the $40 million allocated for a five-year data security/integrity study which IBM announced in 1972.

As an ex-employee, I was encouraged by this IBM-sponsored activity and its commendably bold stance on privacy so, I wrote to Frank Cary, chairman of IBM. First, I offered my compliments on IBM's publishing its privacy pinciples; then I suggested a practical test of those principles by allowing me to review all records IBM had on me.

My credentials were reasonably good. I'd been with the company over 11 years, the first seven being in various personnel positions, including standard and "special" record; the latter four years I spent in engineering and management assignments at various U.S. and European labs.

While on foreign assignment, I'd even used IBM's enigmatic "Open Door" appeal process. Ironically, the crux of my Open Door dealt with how closely IBM's private practices corresponded to its public sector statements. And finally with System Development Division (SDD) President B.O. Evans having confronted me in Boeblingen, Germany with a secret dossier about me, I felt my request to Cary to be a reasonably tough, practical test of IBM's privacy principles. Also, since I'd never been allowed to see the contents of that secret file, I was just plain curious.

Cary's Response Puzzling

Cary's response was prompt, but somewhat puzzling. He said, "we do believe that individuals should have the greatest possible opportunity to see information we retain on them, and, with very few exceptions {??}, we think we can be open, accountable and responsible."

By IBM policy, the only "legitimate" exception I knew of was that of employees being prohibited from seeing any portion of their files containing retail credit information from Retail Credit Corp. (RCC) about them. Presumsbly, this was due to agreements with RCC which restricted IBM from releasing RCC's findings to the principal under investigation.

Fortunately, the Fair Credit Reporting Act has changed things somewhat.

The other curious point in Cary's letter was his assigning IBM's director of employment, Jerry Anderson, to my case. Why not one of his own staff assistants?

A few days later, Anderson called and arranged for us to meet at a local motel the following week. I was puzzled by the choice of meeting place, but said nothing.

Anderson brought only my "regular" personnel file. We reviewed it; all commendatory data was missing. When I asked what had happened to such items as fellowship nominations; awards, etc., he seemed embarrassed and offered no real explanation.

He had, however, obtained and read my Open Door file. Not only was the positive data not in there, according to him, but he'd been given access without my knowledge or permission to a file I'd yet to see! As we continued through the file he'd brought, I saw, for the first time, a copy of what I call IBM's "expungement" letter to the New York Labor Department; a letter I'd been asking to see for over a year.

After resigning from IBM, I'd been unable to find a job. In 14 months of job hunting, a pattern became clear. Initially I'd get good resume reception, cordial interviews, even several strong job statements right down to salary and reporting date, and then zonk!! The freeze-out. I was sure I was being smeared by someone in IBM, but unable to prove it.

My suspicions of IBM's interference in my private life were further intensified when the minister of our church came to my wife and me, transmitting concerns by members of the congregation who were IBMers. They'd been instructed to avoid me, say nothing of IBM's business and, under no circumstances, to do or say anything to anger me.

After enduring a year of rising and falling hopes and creeping paranoia, I went to the Labor Department to see what IBM had said about me. The one document I was shown had three IBM statements:

- "Involuntary separation."
- "Mutual agreement conditions."
- "Unable to meet IBM standards."

I asked for a copy, but was refused. Only the second statement was true. I'd resigned under duress and in protest of what I felt to be deceptive business practices both with regards to users and to the U.S. and British governments.

I'd not been fired as the first statement clearly implied. My performance ratings had been "consistently exceeds job requirements" for the last 30 months of my tenure.

The "Mutual agreement conditions" statement was correct. Not only had I received severance pay as provided by company policy, but I was given an additional $10,000 "kicker," bringing the total to nearly $20,000. Isn't it curious IBM would pay that kind of money to someone classified as a "key" employee whose performance had been consistently above average?

The "expungement" letter finally resulted from my insistence the record be set right. IBM was not cooperative either in writing the letter or in sending me a copy. When I returned to the Labor Department, I found IBM management had been in and reviewed the file, but now the file was no longer available to me, despite the New York labor law clearly stating that, as a principal, I was to have access. This gave me new insight.

As I read the letter – a year too late – in that motel room with Anderson standing over me, I then understood why my employment attempts with the State of New York never got very far and also why IBM was reluctant to give me a copy. It said, "Basic disagreements on policies collateral to the job prevented him from performing at a level expected of him." One statement, eighteen words, had labeled me a troublemaker who could not do his job.

Besides being untrue with respect to official rated performance, it was grossly unfair to raise the issue of policy differences without stating what those differences were and/or giving the opportunity for me to rebut.

I asked Anderson for a copy of this letter. He tensed and said he would have to check. Six months later, after several calls and notes from me, a copy (unsigned) was sent from Armonk.

I never did get to see the Open Door file or any other file on me. I learned that, due to litigation storage brought about hy the government's and several other suits pending, those files may outlive me. Other ex-employees have seen their files, namely Tim Donovan of San Jose. But he had to take IBM to court to get access to his "Alpha" files.

Design Quality of System Output Improving Quickly

The lack of news is often the big news, but it rarely gets covered in any publication. Bad news is the main subject of interest, and it is followed by positive developments. These bad-news items get covered in this column as elsewhere. What gets omitted is the routine events that abound and that often progress without being noticed or commented upon.

Such a development has occurred over the past two years with regard to the quality of informative computer outputs. True, there are still some unintelligible printouts, particularly in the area of utility billing and dual-file accounts – but where everything is under a single control, the situation appears to be improving quickly.

The Taylor Report
By
Alan Taylor, CDP

One of the best and most innovative systems that has come my way recently is from New York Life Insurance Co. (NYL). Here, the systems analyst's problems (which were illustrated in this column some years back) are fairly severe, if the output is to be clearly intelligible to every one of their shareholders.

Unlike a billing operation, where the item, the cost and the balance information is all that is needed, an insurance policy has a whole series of information items that need to be understood by various recipients.

In the financial area, the NYL policy holder is interested in:

- Policy cash value increase and actual.
- Dividend for the current year and total.
- Total Cash Deposits.
- Interest Accrual.
- Interest Rates.
- Items such as policy payments, etc.

So much for the information the policy holder wants – but another whole area involves the information he needs for various purposes:

- Change-of-address method.
- Using his voting rights in the company.
- Completing Internal Revenue Service (IRS) Form 3435.

The system designer faced with this mass of information movement has traditionally resorted to highly organized forms with small printing or references to outside documents.

Items that could be handled generally were handled generally, rather than working out the particular implications of the policy individually for the receiver.

Logistically, this "concentrated" information approach seemed to be related to two factors. The productivity of the computer, which limited the number of computer lines which could be used to handle a particular item, was in itself a good, and apparently unbeatable, reason for using printed formulae and other ways of reducing the amount of output.

Even if this was not considered conclusive, the space available on the front of a computer printout which was to be sent through the mails also appeared to make the concentrated information displays the only practical way for the systems analyst to go.

The printout shown uses a number of constructive approaches to both these problems. The printing is only 11 lines, but it appears on two paper surfaces, not just one. The front surface deals with all the major items, while the second handles the IRS forms, which only need policy holder and return address information.

A major part of the design of the front is the use of wide-open "general" space. In the example shown, this is used to provide the policy holder with needed information about the status of his individual financial matters.

The backs of the forms are used for the general information, precautionary notices (this form does not provide a waiver, etc.) – and all-in-all, the goal of having given all the necessary information seems to have been very nearly reached.

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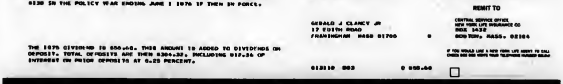

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The printout shown above is the front of a two-part, nonidentical form. Note the lack of more than very incidental headings (name, etc.) and the use of untitled areas to explain items of direct interest to the policy holder. Note also the use of worked-out computations, avoiding unneeessary manual calculations. The standard instructions and other information have been placed on the back of the form, with a second form handling IRS requirements placed behind the return stub portion of the form.

Reader Commentary

Public Minimizes Successes, Magnifies Errors of DP

By Tom Newton
Special to Computerworld

Over the past several months, my patience has been taxed by reports in local newspapers concerning "computer errors."

The general public, which knows little of the technology of DP, has now begun to regard DPers as a blundering group of "professionals" who make life miserable for everyone. Nothing could be farther from the truth.

DPers make errors in system designing, programming, keypunching and processing, and they will be the first to admit it. However, imagine the hundreds of thousands of items of information which are received daily at DP installations across the country that are keyed, processed and reported correctly.

What is the percentage of error? It is so small it would not be worthy of calculation. Yet, article after article, written by persons both within and outside the DP field, attempts to highlight errors compounded by errors. The authors of such articles fail to note the overwhelming successes while elaborating upon the few naturally occurring mistakes.

If those collective errors could be considered seconds or off-quality production, what industry could compete upon a percentage basis. I believe almost any industry would welcome such a low percentage of error as their percentage of seconds.

'People Failures'

Conclusions may be drawn from news articles that the computer constantly makes errors, that an error on one report, payroll check or invoice means errors on all reports, payroll checks and invoices and that techniques in DP have been ill-founded and poorly conceived. However, our errors are not necessarily the results of failure of DP techniques, but the failure of people to make proper use of the techniques.

Do not misunderstand. Errors should be reported – as exceptions. They should be reported in a proper perspective and with appropriate emphasis upon the origin of the error.

After all, errors are not necessarily indicative of poor techniques. The best techniques are only as effective as those persons using them. Mistakes, as they occur, are generally corrected and overcome, and such errors in keypunching, programming, designing and processing do not deserve the spectacular coverage afforded them. Such coverage generally creates the false illusion that DP techniques are universally inadequate.

Errors in DP should be used to grow from and not to stumble on. Naturally, errors that continue to occur day after day, without correction, are not errors in DP techniques, but just poor management, and certainly are not the fault of the computer and its abilities as we are often led to believe.

DP is a constantly growing and evolving field. Few professions change as fast, with as many products on the market from which to choose. New installations are starting out each day that experience the same old problems as well as new ones. Yet, when an error occurs, managers are not praised for their efforts, but condemned for their oversight.

The growth of American industry over the past two decades has been in large part due to technological innovations and developments in data handling facilities. If industry is to continue its growth with any measure of success, it must continue to reckon with computer systems' remarkable capabilities.

No such reckoning is complete until the public is educated about the reliability of DP Systems and the dedication of DP personnel to the task of making life easier for all mankind. That education must emphasize that our techniques are good, our errors are small and above all, that we are human.

Newton is divisional manager of information systems at Burlington Glass Fabrics Division of Burlington Industries, Altavista, Va.

Community College DP Program Meets Real Needs of Business

By L.E. Stone
Special to Computerworld

Many educational institutions are offering degree programs in computer science, but few are providing the training needed for employment in business DP.

Scott Community College of Bettendorf, Iowa, has developed over a period of ten years a curriculum in business programming which meets the needs of business and industry in this midwest area.

The training program began as a part of the Davenport Area Technical School (Davenport Community School District) and became a part of the Eastern Iowa Community College District in 1966.

The objective was training of qualified personnel for local DP departments, and, while some graduates of the six-quarter curriculum have transferred to four-year institutions, the objective remains unchanged.

The curriculum was developed with much input from an advisory committee composed of DP managers. This committee continues to provide advice on curriculum, equipment and placement. The curriculum is continually open to review and change to meet the needs of the people served.

Students May Spin Off

Not all students have the ability or desire to complete the total program. A student may spin off after two quarters of training as a computer operator or after four quarters as a programmer trainee.

Other students are counseled out of the program if they demonstrate a definite lack of interest or aptitude.

Real performance testing takes place during the last two quarters of the program when, through a cooperative agreement with local DP installations, the students are put in an on-the-job project. Students receive pay for the hours spent on this field project, and the project has proven beneficial in placement of graduates.

Faculty members are required to have a minimum of three years related business experience to be certified for teaching in Iowa community colleges. Staff members at Scott Community College have an average of six years DP experience and five years of teaching experience.

Updating of staff is accomplished by providing release time for attending various manufacturers' schools and seminars, through use of audio-visual courses and by active participation in such DP organizations as the Data Processing Management Association (DPMA).

Two staff members are officers in the Illowa Chapter DPMA and a third is serving on the Education Committee for the chapter. And Scott has a student chapter of DPMA with 28 active members.

The student chapter receives excellent support from the senior chapter. Several members of the Illowa Chapter have served as speakers, and the chapter provides an annual merit award of $100 to an outstanding student.

Last year's outstanding student also won the Anaheim Publishing Company Computer Programming Scholarship Award for Fortran programming even though very little emphasis is placed on that language in the curriculum. For the past three years, students from Scott have taken first-, second- and third-place awards in Computer Programming I and Computer Programming II competition at the State Office Education Association conventions.

Scott's Lab

The computer lab at Scott is equipped with an IBM 360/30 with 65K memory. Input-output devices include two 1403 printers, a 2540 card reader/punch, a 2501 card reader, five disk drives and two tape units.

The system is operated in two partitions, providng for both administrative service work and student processing. Administrative service work is the responsibility of a separate staff with both the faculty and service staff reporting to one director. Students have almost unlimited hands-on time in a realistic multiprogramming environment.

Scott has graduated an average of 18 students per year from the business computer programming associate degree program. All graduates of the program for 1974 are employed in DP, and several had multiple job offers. Graduates are working as operators, programmers, DP sales representatives, manufacturers' systems representatives, analysts, DP supervisors and managers in various types of business, including manufacturing, banking, insurance, transportation, government and education.

While the number of graduates each year is small, they are quality people and are much in demand. The faculty at Scott feel their reputation is dependent on the satisfaction of employers and graduates, and a continuous effort is made to provide the type of training needed by students and required by business.

Stone is director of data processing at Scott Community College.

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Speakers Weigh Structured Programming Pros, Cons

• Technique Little Understood

ANAHEIM, Calif. – Structured programming is one of the best known – and least understood – of the modern programming technologies. Others are available and pay off very nicely, though they sometimes have to be modified to be really satisfying, according to a panel of users who led an NCC session on "Managing the New Programming Technologies."

Staff engineer Gene R. Katkus of Hughes Aircraft described a project which included 'Hipo' charts and structured walk-throughs as basic elements in the development cycle.

Clearly an outgrowth of programming flow charts, Hipo charts use a series of symbols to describe graphically to hierarchy, input, processing and output (thus 'Hipo') of the proposed system. Unlike conventional flow charts, Hipo charts show what is to be done, but not how it is to be done, within the system.

Hughes created a Hipo-like chart one level higher – closer to the user rather than to the computer – to show management the data flow to be provided by the developing system, Katkus said.

The structured walk-throughs cited by the engineer are generally formalized meetings of various people concerned with a project, including both general management who will use the final output of the system and the DP technicians who have to create the system. Usually these sessions take place during programming and focus on coding already written, to be sure it meets the specifications of the system.

Better Informed

At Hughes, however, these sessions concentrate on the Hipo charts and take place during system design. With the graphic impact of the charts showing processes to be done in terms management could understand, management was much better informed than in the past, Katkus said.

The charts were successful, he said, even though not a single one was accepted as presented the first time. Many needed several reviews, but the end result was everyone knew what the system was to do before a single line of code was written.

For their part, programmers knew management had a better appreciation of the detailed work they had to do, according to Katkus.

The design-level walk-through has been so successful, he said, Hughes did not have to hold any walk-throughs at all during the implementation phase of the project.

Other modern technologies used at Hughes included top-down and structured programming, chief programmers and teams, a development support library and improved demonstration and verification of the programs as they took shape, he said.

Senior programmer Honien Liu of Pacific Gas and Electric said his installation found an underlying decision to work with data base management systems useful in getting a project up and running more quickly than it might have otherwise. A team approach to the development also helped, he said.

In fact, the utility saw that four separate technologies, including data base, would help, as long as their interactions were properly appreciated. The management of available computer resources, the use of systems analysis design techniques as well as newer programming methodologies all have a part, Liu said.

The interplay of managing computer resources and using the new programming methods would lead to better use of available skills, increased productivity, improved programming code and increased value and life of the systems developed, he added.

Tying into the preexisting data base concepts, the programming methodology provided "real data independence" so files could be altered without harming operational programs. It also eased error checking and exception handling and led

(Continued on Page 16)

• Rules Not Helpful All the Time

By Don Leavitt
Of the CW Staff

ANAHEIM, Calif. – Some structured programming rules help some of the people some of the time, but they can't help all of the people all of the time, according to Peter J. Denning, professor of computer science at Purdue University.

Speaking at an NCC session entitled "Programming – Art, Science or Engineering?," he admitted some of the motivations implied in structured control flows do, in fact, coincide with human approaches to problem solving.

"We do attach some problems in a straight-line sequential way and others we go after by getting some clue about the thing we're working with – and that's the case approach.

"Clearly, we also solve some other problems by repeating a procedure until something convinces us to stop," he said. Thus the human analogies exist for all the structured programming control flows, but still "structured theorems are mechanical procedures to transform all programs into 'understandable' code."

But there are many programming situations when it makes perfectly good sense to create the code in a natural way, without the slightest thought about the proper control structures, Denning said. The human brain really can solve some problems on its own.

Even top-down programming and testing programs early in the development cycle don't always make sense, Denning continued. Those techniques are "proof by deferred assumptions" since still-to-come coding may prove a lot of today's well-tested code to be completely irrelevant.

'Stubs' Partial Answers

"Stubs," or dummy subroutines to keep a program going even when an execution reaches into uncoded areas, are partial answers at best, he said, since a stub doesn't really perform the way the real code should.

The guidelines suggested by discussions of structured programming are "useful to some reasonably successful programmers," Denning said, but admitted in answer to a question from the audience, that the *New York Times* project – often cited by "structured" advocates – was a "disaster."

It didn't do everything the implementors claimed. It had more bugs than at first admitted and was, at best, extremely hard to fix and complete, he said.

DP educator and consultant Ed Yourdon of Yourdon, Inc. in New York admitted that early exercise of stubs is not a proof of correctness of how they will function once they are fully coded.

But, he said, even if all the stub does is print out "Kilroy was here" on the con-

(Continued on Page 16)

Moratorium Won't Stop It

Bankers Told Movement Toward EFTS Inevitable

By Don Leavitt
Of the CW Staff

BAL HARBOUR, Fla. – Neither a moratorium on electronic funds transfer systems (EFTS) nor organization of the National Commission on EFTS can stop the movement toward electronic banking.

That is the impression left by speakers at the annual Operations and Automation Conference of the American Bankers Association (ABA), held here recently.

Keynoter Richard D. Hill, chairman of the First National Bank of Boston, faced the situation squarely. The primary task of the ABA's Payments System Planning Committee, he said, is to get banks' top management involved in the "EFTS revolution."

The ABA and the Payments Committee have a "neutral position" awaiting the commission – still unnamed six months after its enabling legislation – "but EFTS is going ahead," he reminded the 3,000 attendees.

Departing from his prepared text, he said the EFTS movement was clearly recognized by the Comptroller of the Currency with recent rulings on the use of remote banking devices, and "there's not much chance" of a Congressionally imposed moratorium stopping the movement.

Beyond that, he went on, "if the commission is formed and if its report is generated, what the report calls for will long since have come to pass."

The commission is supposed to have an interim report ready by the end of this October and its final recommendations completed by October 1976.

'Shadows, Not Substance'

He wondered if commercial bankers were quarreling with their financial competitors over "shadows and not substance. Congress and the regulatory agencies have shown they will stretch rules when they feel they have to, to help consumers."

The move to EFTS has been and will continue to be "expensive, awesome and fraught with doubts." But it's part of the natural development of banking, from the punch card approaches of the 1950s through the more complete DP systems of the 1960s.

Today's focus must be on total data communications, he said, noting that banks "have the largest collection of equipment available to any segment of American business," but they "lack the linkages to build the vast, flexible network" required to beat down the flood of paper-based entries into the system.

While EFTS is vital to keep things moving between banks, more basic, internal communications must also be strengthened or the banks will lose control of everything. Pioneers on both levels of communication improvement will lead and "they will benefit most, as they should – especially if they look at every aspect of the human interface," Hill concluded.

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In Structured Programming

Rules Don't Always Solve Problems

(Continued from Page 15)

sole typewriter, the appearance of that phrase shows execution reached that point in the program – even if that wasn't the action finally wanted.

Earlier, Yourdon told the group "structured programming is a good thing but the average programmer doesn't know how to do it." Beyond that, "structured programming is relatively insignificant compared to structured design."

Typically, programmers commit a variety of "sins" in attempting to create structured programs, he said, identifying these indiscretions as "convoluted code, perverse code, hidden GOTOs and an ignorance of the control structures required in structured logic."

The degree of ignorance may be illustrated by a recent project which was written in PL/1 and was supposed to be highly structured, Yourdon said. In fact, of about 100,000 lines of code, only 11 were DO . . . WHILEs, "and they were probably plugged in at the last minute by a conscience-stricken programmer," he said.

The lack of guidelines to evaluate design process has led to some pathological data flows. People have learned some of the ideas behind structured programming, but they are still designing "an awful lot of junk." An apprentice approach to the programming profession is needed, Yourdon said.

The distinction between art and the engineering approach required by programming, especially in top-down environments, was illustrated by one of the panelists who said an author of a book doesn't start with a title and then name his chapters before writing a line of text.

Instead, he creates what is in his mind and, if it pleases the reader, is congratulated for his creativity.

That's true, another panelist agreed, but programs aren't written to be pleasing. They're created to do a job to be useful to others.

The distinction between art and technology was made even more clear by a commentator from the audience who focused on maintenance work.

"You can call programming an art if you like, but I've never head of Release 17.9 of Beethoven's Ninth Symphony," he said, amid gales of laughter and applause.

Understanding Necessary To Appreciate Techniques

(Continued from Page 15)

directly to a reduction in the size and complexity of problems being handled by new programs, Liu said.

Success Not Guaranteed

Despite the enthusiasm of users like Katkus and Liu, an advisory technical support representative from IBM, Barbara Lee, warned the attendees they might not have the same degree of success if they tried some of the new techniques.

Structured walk-throughs, in particular, "can be extremely tough on some participants," she warned.

Programmers and others are "not egoless, no matter what some authors say," and the new experience of public review of what they have been doing, sometimes almost secretly, can be difficult to live with, she said.

Pleased that Hughes had felt confident enough of the basic value of Hipo charts to extend their use one step further from the computer, she noted it is "anywhere up to 30 times easier and less costly" to identify a problem and fix it during the design phase than after the system is apparently operational.

But, she reiterated, the new technologies take time to get used to, and most users would be "utterly foolish" to use a critical project as the first one – the test case, really – for their introduction into either the design or implementation phase of the project.

Calculus Operations Backed on UCS Net

KANSAS CITY, Mo. – United Computing Systems, Inc. (UCS) has added Prose, a high-level general-purpose language that offers calculus operations and simulation capabilities, to their language library on its remote computing network.

The language was designed to meet the requirements of engineering, scientific and business problem solvers and is a development of Prose, Inc., Los Angeles.

Prose is an interactive and batch programming language with intrinsic, fully integrated facilities to cover a wide scope of programming, with levels ranging from general purpose operations to very high calculus operations, UCS said.

Operations performed by Prose can be divided into five areas: simple arithmetic and algebra; vector/matrix algebra; convenient input and output; programming of logic path analysis; and variable auditing and trapping.

The nationwide UCS network is based at 2525 Washington, 64108.

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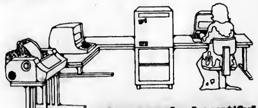

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User Loyalty Trend Evidenced at Phoenix Data Center

By Don Leavitt
Of the CW Staff

PHOENIX – Installations that have already acquired some software from outside sources tend to acquire more. User loyalty to a software vendor is a growing fact of life.

The American Express Credit Card Western Operations Data Center located here is one shop where those two trends have clearly come together, acknowledged Don Pooters, the center's manager for architectural control for redesign.

Now working in an OS/VS2 environment based on two IBM 370/158s, the "hundred or more" application development people at the center make use of a number of packages from a range of vendors. These include the Pro/Test test data generator from Synergetics, the Tape Management System from University Computing Co. And the Syncsort III-6 sort/merge package from Whitlow Computer.

Lately the center has acquired its own copy of the Capex Optimizer so it doesn't have to tune Cobol programs remotely through another American Express data center in New York City, he said.

Four Packages, One Vendor

But the center also utilizes four packages all from one vendor – Applied Data Research, Inc. (ADR). This part of the user's software collection includes Autoflow II, an automatic flow charter; Metacobol, a macro-based cobol source code generator; The Librarian for cataloging user code on disk; and the System Analysis Machine (SAM) for simulation of computer systems.

When Pooters joined American Express, most of these packages had already been picked, so he was unable to outline how the company chose them. But he clearly is happy with the choices – he is currently president of ADR's SAM Users Group.

The simulator has been useful in its predictive capabilities as Pooters and his crew were evaluating proposed hardware changes, the manager explained. SAM seems effective in predicting performance, rather than in actually scheduling the workload, he said.

Autoflow II fit into the redesign process for one-time runthroughs of existing programs. It was used to get a better understanding of the current workload in order to represent it properly in the SAM simulation, Pooters added.

Easier, More Accurate

The performance estimates produced by SAM were easier to prepare and more accurate than those of some other simulators Pooters has seen. He said, for example, that the results effectively equal the actual measurements produced by IBM's VS1 PT routines.

Originally SAM had problems in its SMF translation modules, he added, but ADR's response to his call for help was "excellent." And that is typical of the vendor's response to any problem, although Pooters noted neither he nor any of the other managers at the center could remember any serious problems with any of the ADR packages.

The application development staff has found the standards enforcement features of Metacobol helpful in the center's move toward structured programming, the manager said.

The Librarian is used in its original role as a source program code control system, but American Express also stores SAM modules, internal job streams and concatenated (linked) procedures under the system's control. The package's support of global changes in stored files has become increasingly helpful as the center has moved toward data base operations, Pooters added.

DP Alienation Due To Inhuman Languages

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – "Most people in our culture seem to regard computers as alien, mysterious and inherently difficult to use" – and they're right, according to William C. Mann, a researcher with the University of Southern California's Information Sciences Institute.

The problem is computer languages that serve as the interface between man and machine. These languages are unlike any language known to man because they are almost exclusively command languages, Mann said at an NCC session on user requirements here recently.

"Users can issue commands and supply command interfaces. Other facilities of the interface are designed to aid in the selection and use of these commands.

"There is very little else," he said.

Commands Limiting Subset

Commands are a narrow, limiting subset of the way people are accustomed to talking to each other, he said. "It's not that what we've done [with languages] has been done badly, but that we've left so much out," Mann said.

DPers should not expect command-based systems under development to benefit naive users very much, he said. However, refinements will aid DP professionals and that "very small" minority of heavy computer users who have adapted to working with command languages, he said.

In the near term, the industry should seek ways to supplement the command structure of user languages. In the longer term, users can expect a continuing expansion of the range of facilities in languages, he said.

Three Properties

Mann saw three properties as especially important in languages being developed. The languages should admit more non-commands, he said, and should have stronger declarative and descriptive aspects. They should also allow alternate forms of expression and show more imitation of dialogue, he added.

However, there is a general lack of detailed knowledge of human communication, he said, and many of the things people do in communication are not understood well enough to imitate.

The Information Sciences Institute, Stanford Research Institute and Bolt, Beranek and Newman are all doing research in modeling human communication processes, he noted. This kind of work will be valuable in making direct use of computers feasible and comfortable for broad classes of people, he concluded.

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But Software Stabilization Predicted

Complexity of On-Line Systems Seen Hindering Users

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO – With the growth of on-line teleprocessing systems, terminals will have to be introduced that fit naturally into the user's environment.

This goal will be difficult to achieve because the complexity of teleprocessing systems will remain high and will have to be divorced from the end user, according to Edward H. Sussenguth, director of communications systems architecture at IBM.

The complexity in communications systems can be traced to the nonuniformity of communications software and protocols, Sussenguth said at a session on "Exploring Trends in Teleprocessing" at the recent International Communications Conference (ICA).

"During the next five to 10 years, we are going to see a gradual stabilization of these kinds of procedures and a different kind of protocols," he predicted, adding there will be "more emphasis on international standards."

In order to accomplish the shift to on-line systems, there will be increased "source capture of initial data." A secretary in an office, for example, will type onto a medium which will capture a letter on a screen, with canned paragraphs inserted automatically and the contents then transmitted to the required locations.

The handling of data will be less concentrated in large host mainframes and instead will be distributed throughout the teleprocessing networks, he said.

Typical systems will have terminals at all user locations. There will be as many as 5,000 terminals per network and each terminal will have to handle an average of one transaction per minute with two to five messages per transaction in the larger systems.

Response times will have to be one-quarter of a second for simple tasks, two to three seconds to access a data base and five to 10 seconds for a file search or computation.

Each individual user location will have between 10 and 100 terminals clustered around a controller containing a local file ranging from 10M- to 50M bytes of information. By having files available locally, the systems will have better recovery from failure and faster response times for the terminals.

Minimizing Failures

From a reliability standpoint, failures must never be allowed to crash the entire system. An individual location such as a retail store should be down less than once a year with a two-hour repair time, and a terminal should be down no more than two or three times per year with a four-hour repair time, Sussenguth said.

There will be relatively little stability in these teleprocessing network systems and they will almost always be in a state of expansion or modification. As the computing power is distributed throughout the network, regional data bases will be created. And communications networks will connect the central processing locations with the user terminal locations, he said.

One reason existing software and protocol problems cannot be solved easily is that existing unique teleprocessing networks will have to coexist with new solutions, such as systems configured using the IBM System Network Architecture (SNA), he said.

The first steps toward configuring the new type of networks are already being taken, and in this regard IBM has several terminals which contain 8K bytes of memory in a small computer measuring 3-in. by 4-in. These terminals include the IBM models for the retail store, banks, supermarkets, the 3770 and 3790, all of which are already announced and being shipped to customers, he said.

Another speaker at the session, Dr. S.J. Buchsbaum from Bell Labs, predicted future high-frequency domestic satellites will operate in the 18 Ghz and 30 Ghz portions of the spectrum. A joint Com-

(Continued on Page 20)

FCC Chief Discounts Phone Companies' 'Demons'

SAN FRANCISCO – Telephone industry sources are making "irresponsible allegations of economic harms to our basic telephone system," according to Walter Hinchman, chief of the Federal Communications Commission's (FCC) Common Carrier Bureau.

These claims are being made by industry spokesman at the same time the phone companies are making record profits, Hinchman said at the recent International Communications Association conference.

The FCC has launched an investigation into the full economic effects of competition and his remarks should not be construed as a predetermination of that proceeding, Hinchman said.

"It would be a disservice to the public to remain silent" about the comments being made by some industry lobbyists. The economic proceeding, known as Docket 20003, will give all sides ample opportunity to debate the real issues involved in competition arising from interconnection and the specialized carriers, he said.

Many of the statements being made about the impact of competition imply "assorted demons" if current experiments are allowed to continue. These same sources contend that any tinkering with the status quo will lead to the demise of telephone service, he said.

It appears some of the problems encountered by the phone companies actually stem from inefficient use of facilities due to usage-insensitive rates, Hinchman said.

The maximum impact of all competition to date has only equaled .7% of phone companies' local revenues and not 70%, as has been claimed in some quarters. The $3.5 billion in proposed intrastate telephone rate increases and the need for these increases have been loosely attributed to competition, Hinchman said.

Full-page ads in some papers and inserts in monthly phone bills have made this claim. Some or all of these increases may be justified but, if they are, they have been caused by increased costs of providing service rather than the effects of competition, he said.

Another speaker at the session was regulatory attorney Philip B. Patton, who said the Office of Telecommunications Policy and the Administration generally, "supported by the news media," are now engaged in a "high-pressure deregulation campaign in Washington apparently intended to benefit the public by creating more competition in all regulated businesses."

Many state regulators think this "out-of-control deregulation fever could possibly result in throwing Ma Bell's baby out with the bath-water," Patton said.

It is generally conceded that competition in communications is here to stay, but the long-term effects of interconnection, the specialized common carriers, the Justice Department suit against AT&T and proceedings to liberalize the joint use and resale tariff provisions cannot be preicted, he said.

Most state telecommunications regulators "are antagonistic to the idea of permitting more liberal interconnection of customer-provided equipment" because of adverse effects on local phone services, he said.

Pouzin Hits Standards Efforts For Lack of User Representation

By Ronald A. Frank
Of the CW Staff

ANAHEIM, Calif. – Until communications users get organized into a profession, it will be too costly and time-consuming for them to get involved with the formulation of communications standards, according to Louis Pouzin of the Institute de Recherche d'Automatique in France.

Powerful corporate bodies now develop standards that are a matter of convenience for them, but these standards are not always the best solution to a problem, he said.

Speaking at a session on "International Data Communication Policy" at the recent National Computer Conference, Pouzin said proposed data standards are not always the best technical, commercial and political approaches to a problem.

The same people sit on most communications standards groups and nobody moves until a de facto standard has been announced, usually by a vendor, Pouzin charged.

He listed such groups as the American National Standards Institute (Ansi), CCITT, the European Computer Manufacturers Association (Ecma) and the International Standards Organization (ISO) and said the user has virtually no power and very little chance to get his voice heard before these bodies.

But users do have the option not to buy certain equipment used to implement a communications standard, he pointed out.

Government agencies are members of Ansi, according to Paul Muench of AT&T, who also spoke at the session. These agencies are users, he said, and it may be that other users "don't give a damn" about the formulation of communications standards.

Clayton Andrews of IBM Switzerland called international communications policy an extension of national policy and admitted the international communications area does not "look very neat" as far as standards are concerned.

Citing the nonuniformity of European tarrifs, Andrews said the cost of a 200

(Continued on Page 20)

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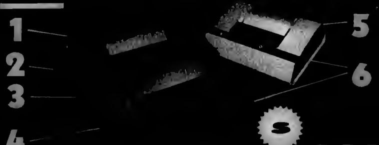

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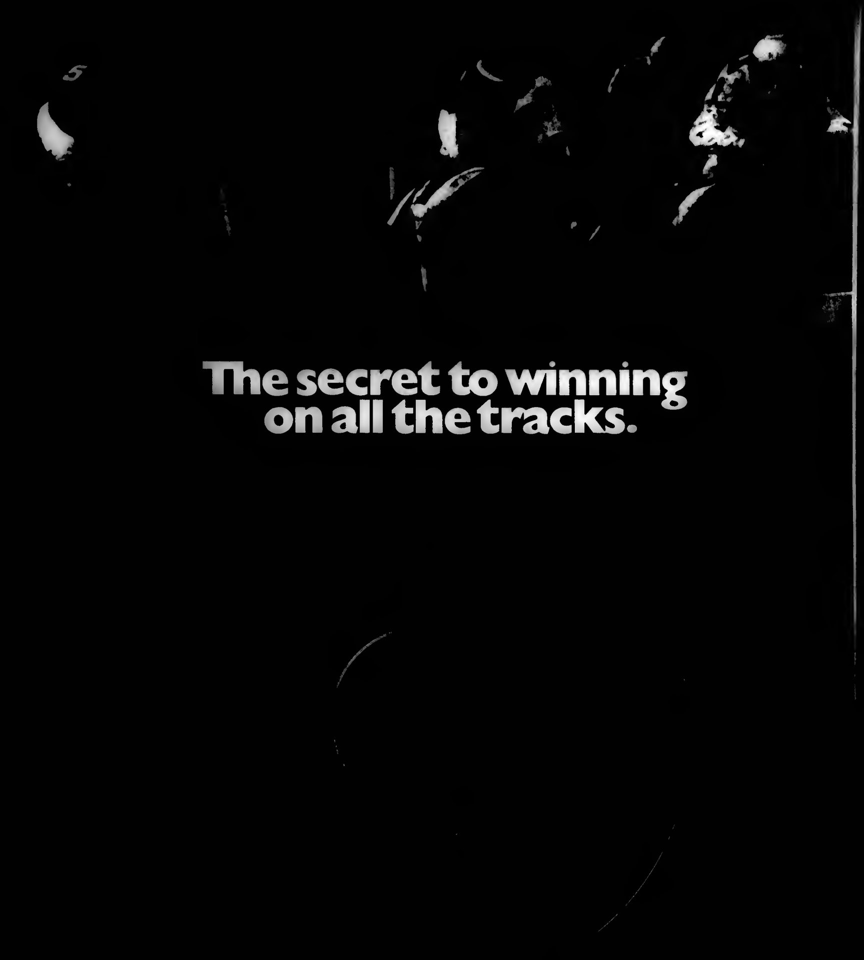

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Future On-Line Systems Seen Too Complex for Users

(Continued from Page 18)

kilometer point-to-point private line ranges from $1,250/mo in Germany to $250/mo in the UK. In between these extremes, a similar line costs $900/mo in Italy and $560/mo in France, he said.

Private networks will be allowed only when public networks do not meet users needs according to proposed standards, Clayton said. But Pouzin took issue with this, pointing out there already is a large number of private communication networks operating in Europe and across the Atlantic.

He listed private nets operated by Electricite de France, Barclays Bank, IBM, General Electric, Tymnet, Swift, Euronet and Eurailroad as examples and said each is expensive and incompatible with the other.

The speakers agreed the user will want convenient attachment mechanisms to public networks. This will be necessary when each country implements packet-switching networks.

In a related session on public packet-switching networks, Dr. Lawrence Roberts of Telenet said the packet nets will have to "divide and recombine" when they meet at national boundaries. This will not be a large problem, he said, predicting future users will simply add an "international header" to their data to signify which is the destination country.

But Roberts admitted that problems arising in international packet nets could lead to fingerpointing unless good cooperation is established between countries. England and the U.S. are too far along with their nets to make major changes, he said.

In France, a packet net called Transpaç is being developed, according to Remi Despres of CCITT, Rennes Cedex. About six network nodes with a capacity to handle 1,500 connection ports will be in operation by 1977 and 13 nodes are planned for the network by 1978, he said.

The Transpac net will have three levels: a link control level, a packet level and a signaling protocol level. And there will be "nonstandard" protocols for character-oriented and binary synchronous terminals, Despres said.

The French are also very concerned about future interconnection with other packet-switched networks and want to see a common standard interface within CCITT standards, he told the attendees.

Vinton Cerf, chairman of the session, explained basic approaches to packet nets are still not settled. Among the areas where different approaches are being debated, he mentioned the question of how a host CPU will access a network.

Some believe there should be a "virtual call setup which is maintained until all data is transmitted," he said, but others favor the source and destination being on each data transmission.

Current Standards Efforts Hit

(Continued from Page 18)

sat/AT&T satellite scheduled for launching next year will have beacons operating at these frequencies to test the effect of rain on transmissions, he said.

For local distribution nets, Buchsbaum predicted the future use of passive repeaters in the 50 Ghz and 160 Ghz Bands. But this capability will have to wait for the development of microwave integrated circuits, he said.

The digital technology terminal "of the next decade or two" will include a display, light pen, phone, keyboard and camera contained in a desktop unit. It will be controlled by a microcomputer and the terminal will be designed with solid-state technology, he said.

Tape Memory Links To Tektronix 4010s

BEAVERTON, Ore. – The Tektronix 4923 digital tape cartridge memory is available in two models that use 3M's DC 300A tape cartridge.

The standard 4923 interfaces to the Tektronix 4010 family of computer graphics terminals, while the 4923 Option 1 interfaces to the RS-232C data communications line and the Tektronix 4023 alphanumeric terminal.

The 4923 provides a means of having local program storage capability, thus reducing time-sharing file costs. It supplies audit trail operations for monitoring communications between the terminal and the host computer and also acts as a buffer device to store data from the Tektronix line of graphic tablets.

Storage capacity is approximately 234K eight-bit bytes formatted into 128-byte records. The 4923 also has a self-test feature to verify instrument operation.

The standard 4923 terminal bus version is capable of operating on data transfer rates up to approximately 13K bit/sec.

The 4923 Option 1 has a local/on-line switch which allows the user to interface with the host computer without the 4923 being on-line.

This model has the capability to select different bit/sec rates for the four different data paths between terminal, Modem and 4923, which allows the terminal to receive data being played back from the tape at 9,600 bit/sec to transmit at 300 bit/sec, in a typical modem application, the firm said.

The price for each model is $1,895 from the firm, which can be reached through P.O. Box 500, 97005.

DDI Signs Decwriter Pact

GREENWICH, Conn. – Data Dimensions, Inc. (DDI) has an agreement with Digital Equipment Corp. under which it will purchase DEC's Decwriter II data terminals and market them to computer users under a variety of rental, lease/purchase and purchase plans.

As an example of the type of rental plan the company will offer, DDI said a Decwriter II could be rented for "as little as" $65/mo, including maintenance.

A full equity lease/purchase plan without maintenance is also available at $45/mo.

Under DDI's agreement with DEC, maintenance of Decwriter II's will be available through DEC's nationwide service network.

The firm is at 51 Weaver St., 06830.

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Monsanto Net Links Plants to DP Center

ST. LOUIS – The Monsanto Commercial Products Co.'s container and extruded products business groups have developed an intelligent terminal network which provides data communications between 10 of its manufacturing plants and Monsanto's corporate DP center here.

Selected after evaluation and study, Datapoint 2200 intelligent terminals were chosen because they control the work situation with software, eliminating all but essential data entry keys, Monsanto said.

The two Monsanto business groups produce plastic bottles, film and related products. The groups are managed from headquarters, aiso in St. Louis, and data processing is provided by a centrally located IBM 370/165.

The groups' basic accounting work is centrally processed. Data entry supporting customer accounting, payroll, inventory and production control, however, originates largely at the geographically dispersed plants. Therefore, a prime task of the communications network is to facilitate entry and transmission of accurste accounting and production data to the central DP site.

Problems for Planners

The far-flung nature of the network and the small size of each location created problems for Monsanto's system planners. Few of the sites could justify the cost of a stand-alone local DP department.

A conventional IBM 2780 terminal installation at one plant proved the combination of professional personnel required to staff it and peripheral equipment required to support it was too expensive.

At that point, management decided it needed a network of devices which would provide fast, two-way communication with St. Louis and which could be operated by existing plant clerical personnel. This network was to operate in remote batch mode, preferably in emulation of the IBM 2780 communications techniques. The Dstapoint intelligent terminal met these objectives.

Today, Datapoint 2200 intelligent terminals are installed at ail major plants. "The Datapoints have succeeded in enabling nonspecialist clerical personnel to enter and transmit largely error-free data to St. Louis. In fact, plant management now has the ability to select from a variety of reports which previously were only available in St. Louis," according to Ted Steele, one of Monsanto's information systems managers.

Another advantage of the new system, Steele said, is the "speed and ease with which nonspecialized persons learn the operation of the terminals."

Each of the 10 plants transmits data over dial-up lines using Bell modems at 2,400 bit/sec. At four plants, ICC data sets are installed for backup facilities over leased lines.

As part of the network, the company operates two ICC multiplexers, one in Los Angeles and the other in New Jersey. A total of 16 terminal systems are connected to the net and, within the next month, the company plans to upgrade transmission speed to 4,800 bit/sec.

Terminal Transactions

Data entry is controlled by a computer-generated "form" which appears on the terminal's screen. Any number of forms can be generated and each controls the data as it is entered.

The operator fills in each form; as data is entered, a variety of tests verify data requirements are being met. If an error is made, the Datapoint will emit an audible signal and refuse edditional data until correction is made.

The 2200 features two built-in magnetic tape cassette drives. A standard Monsanto Datapoint terminal contains 8K characters of internal, randomly accessible memory.

Monsanto has equipped its installations with medium-speed printers, either a 125-char./sec or 300 line/min model, depending upon the print volume requirements at each site. This configuration provides facilities to perform both the data entry and remote batch retrieval tasks.

All date inputs are made at the plant sites and batched for daily transmission to St. Louis. Reports returned from St. Louis generate between 100,000 and 500,000 lines of printed output monthly at each plant.

These reports include daily production status, cost variance, inventory position and other management information.

In eddition, all payroll checks, documents and reports are transmitted over the network and printed at the plant.

Information is transmitted to each plant accountant, enabling him to complete his entries and close his books earlier each month. This, in turn, enables the plant to provide the data necessary for issuing earlier monthly reports.

Coupled with other procedural accounting changes in St. Louis, the issuing of monthly reports is being accomplished within three or four days after the end of the month, compared with a week to 10 days a year ago.

An important ingredient in the network's success is the fact that each Datapoint duplicates the communications technique of the IBM 2780. This allows a standard interface with the centrally located 370/165 which has an IBM 3705 front end for terminal line control.

Programmer Judy Harley of Monsanto Commercial Products Co.'s Information Systems Group enters production data on a Datapoint 2200 intelligent terminal.

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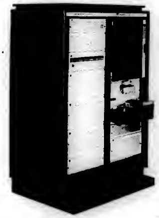

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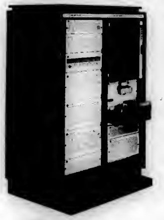

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DP Center Supervisor Advises

To Optimize Operations, First Seek Out Bottlenecks

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – Data centers often spend a great deal of time tuning their CPUs and not enough in finding other bottlenecks that can make jobs run late, according to Cal Bower, supervisor of the Corporate Computer Center at Johns Manville Corp. in Denver.

The problem is very often "the weakest-link-in-the-chain syndrome," he told attendees at an NCC session on "Optimizing the Computer installation."

To illustrate, he described a case of late receipt of data to a user at Johns Manville that would occur on the eighth day of a 14-day closing cycle.

Bower said he approached the problem much like a detective, going to the scene of the crime, in this case, the accounting department, and then tracing back through the steps of the DP operation to the bottleneck.

From the data conversion stage on, Bower found out what time the job in question was to come in and when it was to be delivered to the next support center.

Delivered time minus received time equals the maximum time for that step if the job is to pass through on schedule, he said.

Maximum time minus actual time the support center needs to do the job is the slack time in a step, he noted.

DP Flow Pattern

The DP flow pattern at Johns Manville goes from the user through data conversion, preprocessing assembly, processing, printing, quality control, output and then to distribution centers.

As he charted the maximum time schedule for the job in question, Bower found it arrived at the data center on time, but came out of data conversion 3-1/2 hours late, was behind schedule to the same degree through the assembly stage, but was only 1-1/2 hours late for the rest of the steps after the processing stage.

It was apparent the data conversion group could not handle the load they were given in the amount of time they were supposed to do it.

Yet the processing stage compensated for much of the time lost in data conversion, and Bower looked to see if he could find an economic way for the other stages to somehow become faster so the job could be in the user's hands on time.

But he found various constraints prevented the other support centers from compensating for the delay in data conversion.

Rather than adding people and equipment to the data center to solve the problem, Bower's solution was to ask the accounting department if they could shift some of their workload from the eighth to the seventh day of the closing cycle. Bower also split the job stream. The ultimate result was that the output began to arrive in the accounting department 5-1/2 hours early, he said.

Johns Manville can produce a job flow analysis out of this same methodology, Bower said. It also helps the DP group give a user a better idea of when he's going to get his output," he said.

Aetna-Span Data Processing of Hartford, Conn., credits a system of computer problem reports (CPR) with saving it about $250,000/year and improving relations between the user and operations areas.

Another panelist, Robert Garabedian, who helped develop the system for the firm, said the serially numbered sheets list the job name, the date and an operator identification of the type of problem. The report form also identifies the device number, system number, time correction was begun, time machine was returned to operation and other data, he said.

The next morning this report is on the desk of the person who ought to be informed of the problem. The CPR control unit keeps track of follow-up action and the knowledge that follow-up action is occurring boosts user morale, Garabedian said.

Meanwhile, Aetna has input and processed CPR data to produce management reports that show what problems arise, where they occurred and how long they take to fix.

And, if the user does not like the remedial action, there is another CPR form to buck the problem back, Garabedian said.

The software which Aetna markets includes a CPR recap by device type, "which is a good way to find out how one type of device will hold up against another," Garabedian noted.

"Often we take in an example of a device and run it for a time in our shop. These reports show how much lost production time we are experiencing with those particular devices," he said.

The CPRs thus provide a means for the company to protect itself from a full-scale switch to problem-laden equipment, he stated.

Standard Interfaces Goal Seen Distant

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – "I cannot hold out any great hopes to you that we can foresee the adoption of an input/output interface standard in the immediate or foreseeable future," a Computer Industry Association consultant told NCC attendees here recently.

Speaking at a session entitled, "The Impact of Computer Interface Standards," Norman Ream said a standard interface would bring tremendous user savings. There has been progress towards this goal, "but now it appears, in some ways, we are digressing."

He put the blame on American mainframe manufacturers, "who uniformly oppose" such standard interfaces; and on the Federal Government, which, as the largest user in the world, should have exercised its influence, he said.

An American National Standards Institute (Ansi) committee on the subject has been active for several years, he said, "but its pulse rate is not very high."

The National Bureau of Standards is also backing away from past interest in computer interface standards, Ream charged. An NBS staffer in the audience denied this, however, and said, "we're working harder on it."

User Demand Needed

"The only way we will get the economic advantage of such a standard is through active user demand," Ream advised the sparse audience.

But, "How does a user demand a standard when there isn't one?" an attendee asked. Users should band together in their associations, Ream replied.

"Users have a responsibility to let their manufacturers know they are interested in standards. I think we fall down on that quite often," agreed Dale W. Zobrist, a process control systems engineer for Alcoa in Pittsburgh.

A homeowner can fill his home with electrical appliances made by different vendors and unplug one as he plugs in a fancier "upgrade" with no problems, Zobrist said.

Why should the computer user not have more of that freedom? he asked.

Standard Interfaces Successful

On a more optimistic note, Zobrist and other panelists cited considerable success in the application of standard interfaces in industrial computer systems.

A big objection to standards is they hold back progress, observed Dale Horelick, a staff engineer at Stanford University.

That ties into the question of whether there should be a single standard or whether a whole collection of interface standards would be best, added Gary E. Jones, of Odec Computer Systems, Inc. in Warwick, R.I.

"We may be trying to come up with the whole thing the first time and make it perfect. No wonder it takes time," he said.

As a printer vendor, Odec has to face the vexing problem of which of many possible function capabilities it should build into its interfaces.

"I think we should shoot for basic definitions, with the same name on what functions peripheral vendors have to handle at their end," he said.

High Cost of Graphics Systems Makes Justification Necessary

ANAHEIM, Calif. – Computer graphics is expensive enough and management and accountants are dubious enough that the user has to devise an effective rationale to justify using it.

That was the consensus of panelists at an NCC session on the "Economics of Computer Graphics."

With interactive computer graphics, its advantages to the user is very often put in qualitative, not quantitative terms, noted S.H. Chasen, staff scientist with Lockheed Aircraft in Marietta, Ga.

The task of determining economic benefits is made harder by the method by which graphic facilities are charged, he said.

Potential users of a startup or low-use graphics system may be scared off by costs, he said.

And high graphics console charges at another site may cut the level of graphics use and drive charges still higher.

Users could avoid these problems if charges were predicted on an expected level of use over a reasonable time frame, Chasen said.

The first step in establishing an appropriate charge is to determine a use charge based on graphics utilization over all applications that could show any potential

(Continued on Page 24)

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A Look at the Future

Low-Cost Storage, Logic Technology to Widen DP Use

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – Low-cost storage and logic technology can lead to an abundance of hardware that could furnish DP capabilities to thousands of people who have never used computers before, an IBM scientist told a session on "Future Prospects in Data Processing" at the recent National Computer Conference.

"It seems quite reasonable that before 1980 we will have a hundredfold improvement in cost per bit of semiconductor storage over that available today," Dr. Bernard J. Greenblott said.

Storage density is another key factor in achieving cost and size reduction, Greenblott said. He predicted a real density for IBM tape and disk products will move to 10^7 and 10^8 bit/sq-in. by about 1980.

Evolutionary steps, not breakthroughs, could lead to a 200 cubic foot processor 10 years from now with 10^{12} bits of archival store and 10^9 bits large-scale integration (LSI) merged storage and logic.

This system could match the processing power of 10 of today's IBM 370/158s, using 2,730 tape reels on-line, he said.

While Greenblott expects technology changes to continue, he does not expect "that the exotics such as bubbles and Josephson tunnels will enter into the mainstream of technology right away – or at least until they can compete economically with the state of the art in LSI and disk/tape technologies."

While technology can be predicted with some degree of confidence, it is too early to say how privacy and data security factors, energy constraints and ecological concerns, safety and other design considerations will enter into future DP systems, he said.

Utilitarian Principle

Greenblott noted how light-emitting diodes (LED) went from being curiosities to their present position on calculators and wristwatches. This is an illustration "that a low-cost, utilitarian technology will eventually find its outlet in society," he said.

"When high-function terminals, simplified programming and costs to the user drop down toward the level of the cost of telephone service, I believe we will see the utilitarian principle in action again," he said.

The era of DP abundance has not yet arrived and the sharp rise in the acceptance/demand curve of the general public's use of terminals has not yet occurred.

But already children are becoming accustomed to the benefits of data processing through their schools, he said. This, in combination with lower-cost hardware, could bring us to the take-off point for much wider computer use, he said.

The same hardware advances that will boost the capability of large-scale processors will create markets for microcomputers in such applications as computer bartenders, security devices and the amateur computer, according to Univac's James C. Nelson.

As they become less expensive and faster, microcomputers will replace the minicomputer, Nelson said. More accurately, the new distinction will be between dedicated control computers and small general-purpose computers, he stated.

But what does the future hold for software, "and how are we going to bring all this hardware to the people that are going to use it?" a questioner asked from the floor.

"As it is abundant, you'll find it economically feasible to put more software functions in the hardware," he was told.

Justification Needed For Graphics Systems

(Continued from Page 23)

benefits, Chasen said.

The resulting charge would then be based on the maximum operation of the graphics system. This rate could then be used to weed out applications in which it would be too high a price for effective graphics use.

"With the smaller set of potential applications, an amended use charge would be computed, remaining applications would be studied in light of the modified charge and the iterative cycle would be continued until there is convergence on charges and applications which will use the system," he explained.

But if there is no convergence, then there would be no application set for which graphics is cost-effective, he ssid. The charge could be subsidized or put into overhead to allow graphics applications to develop.

Users can regard graphics as just one form of reports that may be more effective than other types, said Thomas H. Johnson, lecturer in the Decisions Sciences Department at the Wharton School.

Time-sharing services offer packages that are a good introduction for the user interested in this approach, he said.

IBM's Time Sharing Operating System (TSO) is another area where graphics can be an easily justified enhancement, he said.

Another way to cost-justify graphics is to market the software abroad, according to Thurber J. Moffett, a Culver City, Calif. consultant. This might take a market study and some extra work on the software itself.

Another solution is to look forwsrd to the ultimate consumer of the graphics system for help in justifying it.

As an example, Moffett mentioned a French highway design team that used batch optimization techniques to weigh the advantages of making a road flat to save auto fuel against the lower cost of hugging the terrain.

But beyond this, the design team used a graphics system to visualize how these road design decisions will affect the driver's safety. When working with the system they could easily determine how their safety changes affected the construction cost and auto fuel consumption variables in the road design, he said.

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Distributed System 'Headaches' Seen Outweighing Cost Benefits

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – With the price of hardware going down, "We can put processing power almost anywhere without bankrupting ourselves," Prof. David J. Farber of the University of California at Irvine told attendees at the recent National Computer Conference.

Therefore, "It's not surprising that we can get into distributed systems," he said. He defined a network as an arrangement that allows machines to talk with each other, while in a distributed system they collaborate with each other.

But while the distributed concept was a favorite with NCC speakers this year, it drew some criticism in the final session of three devoted to "Future Prospects in Data Processing."

Distributed systems undoubtedly offer some cost savings, but they can also bring headaches, Thomas N. Pyke Jr. of the National Bureau of Standards warned.

The biggest question is "How do we control a distributed site?" he asked.

"The more we distribute computing, the more difficult it will be to maintain hardware and software," he said.

There are also repair problems when sites are all across the country, he said.

"How do we assure security in a network of this type?" he asked. The task is hard enough at a central site, but what about a location that depends on a much smaller group of people?

Frederic G. Withington of Arthur D. Little remarked that putting in systems on a dispersed basis will make the user dependent on them.

What would be the impact of catastrophic failure at the central site? he asked. What about the more common problem of downtime there?

"How are we going to train the people in the distributed sites?" he also asked. "Will it all come down in a great crash some day without anyone knowing how it works?"

Additionally, Withington philosophically questioned the whole rationale of bringing computer power to more and more workers' jobs.

Although each application case may be individually attractive, perhaps the aggregate effect will be bad, he said.

It would involve matching a numeric, electronic machine with a human that is not that at all, he said.

Farber noted a lot of future computer applications will not have the sort of manual precedent earlier payroll programmers, for example, could rely on.

He gave as optimistic a statement about software as anyone in the three forecasting sessions when he said, "We are beginning very slowly to get our hands on the tools necessary to design a system" before coding it.

DPers are also beginning to get ideas on modular design of software that could lead to erector-set software building, he said.

Dynamics of Change Explained

ANAHEIM, Calif. – The way things change doesn't stay the same, according to Arthur Schneider, director of storage development for Univac.

In just a few years, the focus of changes affecting the user/vendor interface will go through a complete inversion, he predicted.

Schneider talked of three elements: the CPU, its operating system and the memory (including I/O, peripherals and communications terminals).

Three-Phase Change

In the pre-1970 era, users were in a situation where a vendor provided a CPU that didn't change much. The memory hardly did either, but the operating system did change.

In the second phase, which extends to the present, the CPU is staying static, but semiconductors are bringing "fantastic evolution" in the memory area and other hardware. Operating systems continue to change.

In the years after 1975, semiconductor components will finally push CPUs into some change. Manufacturers will deliver a CPU and then return from time to time to make evolutionary changes in the machine over its useful life. Operating systems will continue to change.

In the subsequent phase Schneider described, the CPU, memory and other hardware will continue to evolve, but the operating system will have to become static.

There is a point where users can no longer put up with operating system changes, he explained. In this final phase, computer systems will be made up of many evolutionary hardware modules, and their operating systems will stabilize.

Tire Company Takes Delivery Of First System/3 Model 8

JACKSON, Miss. – Big 10 Tire Company, Inc. here has become the first firm in the nation to install the System/3 Model 8.

The Model 8 replaces the firm's first computer, a System/3 Model 6.

Big 10 uses the computer for a variety of applications including sales analysis, payroll, inventory control and the registration of hundreds of thousands of tires.

The firm is required to register the serial number of each tire it sells, and the name and address of the purchaser in the event of a recall of tires that may be defective.

The company sells an average of 180,000 tires a year and, since it is required to retain sales information for three years, there are over a half million tires registered.

Decision Adds Field Service

HORSHAM, Pa. – Decision Data Corp. will now provide field engineering service on card punches that OEMs have purchased for resale or lease to end users.

The service will be available on a contract basis to a wide range of systems manufacturers and will cover both technical service and parts.

Equipment could include 80- and 96-column card punches, card readers and reader/punches, communications terminals and other products.

Decision Data is at 100 Witmer Road, 19044.

"Before you buy a data communications monitor, you should know why we use DATACOM."

Says Harold Sheahen,
Vice President MIS,
United Stationers
Supply, Chicago.

"I know of no other monitor that's comparable," he continues. "DATACOM/DC must be the best kept secret in software today. It's core-thrifty, easy to use and has proven extremely reliable over the past three years. And, on those few occasions when we have needed help, CIM was right there with support.

Most importantly, DATACOM's flexibility allowed us to start small and then grow with our requirements. We've grown from sixteen terminals in 1972 to forty-five today. Growth has been smooth and economical, thanks to DATACOM/DC."

Find out why Harold Sheahen and other DATACOM users are pleased to be in on "the best kept secret in software." Call or write
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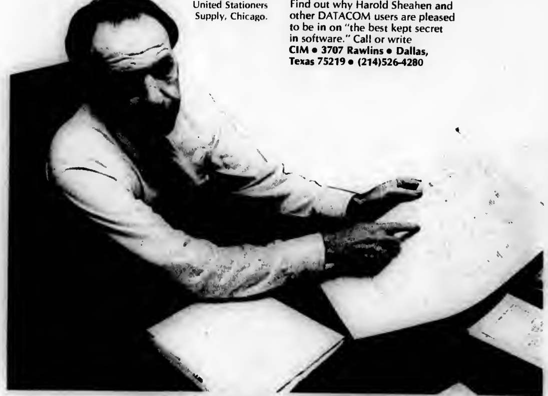


DATACOM/DC
Data Communications Monitor
DATACOM/DB
Data Base Management System

The Resource Savers from
CIM
an insyte company

Don't Provide Help for Doctors

Inadequate Automation Cited as Health Systems' Flaw

By Nancy French
Of the CW Staff

ANAHEIM, Calif. – Most computer-assisted medical systems developed over the past two decades have failed because "faulty systems analysis resulted in computerizing only small parts of health care activities without really helping the doctor himself," Dr. H.K. Literland of the Vancouver General Hospital in British Columbia told National Computer Conference attendees here recently.

A health care system should "include programs that can help the physician acquire knowledge through history taking and help in diagnosing the problem and selecting a treatment," Literland said.

A health care system should also provide a means of collecting data during patient visits, when the physician may perform a physical examination and request X-rays or laboratory tests, he said.

Often a patient's socioeconomic group or psychiatric problems, for example, bear on his illness, and data must be collected and evaluated in light of these facts to produce the proper prognosis and treatment, he said.

A computerized medical system must also help with planning and executing treatment, which includes prescribing and writing medical orders and evaluating the outcome.

In cases where outside factors must be considered in conjunction with the patient's current problem, history must be obtained by recall from the patient or from another doctor, he said.

What can the computerized system do most to help? Provide the knowledge to help diagnose complicated cases, Literland said. Here, on-line access to medical information in which the doctor has confidence and which he knows is as current as possible would help greatly, he said.

Information from other physicians, that might bear on the case, including data on treatment for other problems, is another way, he said.

It should definitely help in execution of the plans – from ordering a prescription to scheduling surgery.

Finally, easy, quick recording of data concerning planned treatment and results rounds out the picture, he said.

A good system would include many conveniently located terminals to make data entry easy and allow for narrative-style data entry. Rigid coding results in lost data, Literland pointed out.

In consideration of patient privacy, information with patient-identifying information should be transmitted only to people who are involved in providing care. Transmission of prognosis and treatment with the doctor's name attached also should be kept within the system, he said.

Success Story

Dr. Galen Robbins, of Oklahoma City's cardiovascular clinic told attendees one of the few existing success stories – that of the clinic's computer-assisted medical system which provides ambulatory medical records and operational information for the clinic.

Designed by the Meditec Group, the system has been effective not only in administrative chores, but also in monitoring and helping patients with high blood pressure, Robbins said.

"When we started to develop this system, all we wanted was a better record without paying any more money for it and without any more effort from the doctors," he said.

"Now that it's been running for a few years, we have spent more money on hardware, but saved money on personnel and vastly saved doctors' time.

"In the medical profession you have to have a carrot to dangle in front of the donkey, and a better record was our carrot," he explained.

But the cardiovascular clinic's system worked where a pilot project attempted at the University of British Columbia didn't because "we kept it small and simple," Robbins said.

Automated Interview Important

The automated interview is an important part of the system, Robbins said. Through use of a CRT, the doctor can see the patient's past medical history, the family history and risk factors, he said.

The interview is based on simple forms used to capture the materials. "We found we could code normals merely by circling the information on the form. As for abnormals, we found we could code nearly 95% of those. Abnormals requiring free text amounted to only 5%.

Pertinent information collected at previous meetings can be brought forward on the system with a scratch of the pen on the word "same," he said.

Each problem has an accompanying date which cross-references a hard-copy file filled out by the physician. The date medication was started is also noted, and that information is cross-referenced to a paper file, he explained.

Benefits of the system include easy access to information by office personnel who must retrieve the information to answer telephone inquiries from patients.

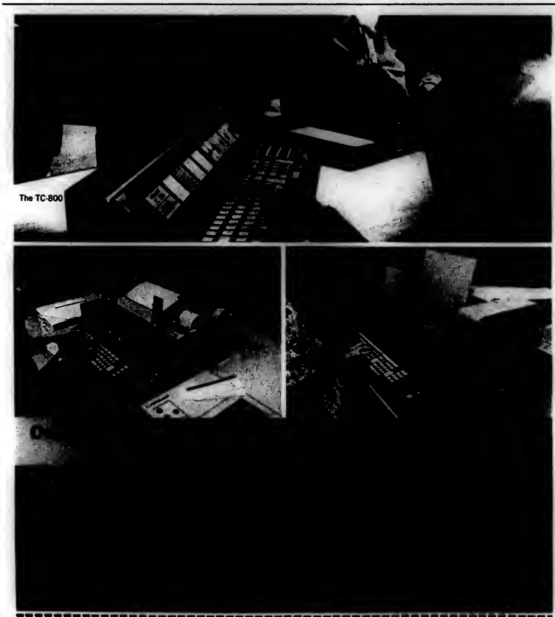
The system also permits data transfer to the emergency room, enabling emergency room personnel to get a complete history before the patient even arrives on the scene, he said.

For purposes of audit, "we can correlate the presence of medication with diagnosis," he said. "Recently we found 20% of those patients receiving diabetes medication had not listed diabetes in their medical histories."

For statistical purposes, retrieval is also very simple. "Through protocol capture, we can study data both from the prospective and retrospective point of view," Robbins noted.

In addition, the system does all the office billing and appointments, he said.

The system "has had an important impact on hypertension patients and emergency room coordination, helped provide better office care, increased our incomes and reduced the number of employees needed to run the clinic," he said.



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Transaction Processing:

One of the ways Honeywell helps you get data into your computer faster, store it more efficiently, and make it easier to get to.

...A major trend in interactive processing

Interactive processing—putting those who need accurate and timely data in direct contact with the computer—has grown rapidly in recent years. So have the benefits.

- People who are far away from the central information system have direct access to its processing power.
- Managers receive more timely and more accurate data for making decisions.
- Employees can easily and quickly interface with the computer and its stored data in their day-to-day work.

There are three modes of interactive processing: remote job entry, time sharing and transaction processing. We've been describing them for years as the "interactive dimensions" of Honeywell's General Comprehensive Operating Supervisor (GCOS).

Honeywell's GCOS makes it possible to use any or all of these dimensions concurrently.

Of the three, transaction processing is the newest. Today it's a proven form of processing that's easy to implement in virtually any information processing environment.

Now, more and more computer users are turning to transaction processing to help cut costs and increase productivity. As a result, transaction processing is rapidly becoming a primary processing mode.

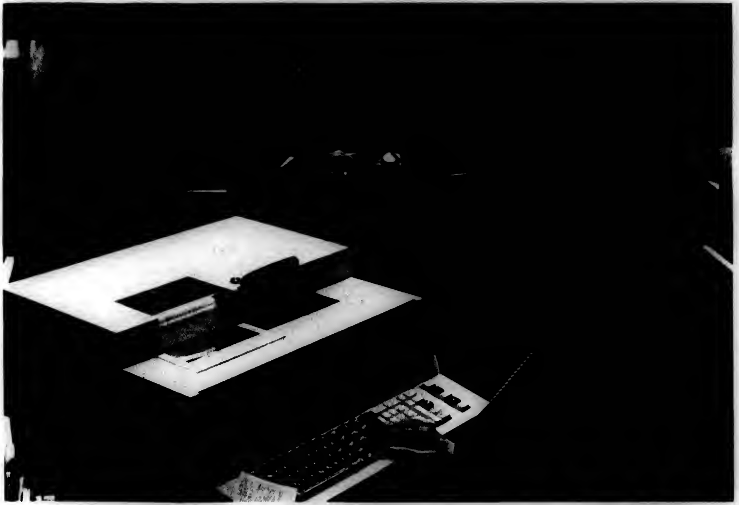
Non-technical people can use transaction processing.

Through simple-to-use terminals that don't require computer experience, employees access a remote information processor and data base. Transaction processing offers the information each person needs to carry out a specific activity. And in turn, the information entered through the terminal is used to keep the data base current.

The desired result is increased productivity. The person at the terminal has the information to do a better job... to close a sale, to provide a service, to speed up a routine job and reduce paperwork. And there is increased productivity in data processing as well. Many input preparation and file updating steps may be eliminated.

Transaction processing is where information network technology is headed. In the next ten years, it will make one of the most significant contributions to business efficiency.

But since today is no time to be experimenting with untried techniques, you'll be glad to learn that Honeywell has had years of experience in all the areas that make up a transaction processing capability.



A bank teller in a remote branch keys in a customer deposit and immediately updates the customer's account in the central information file.

A sales administrator enters an order into a terminal for a salesman, and, while the customer is waiting, the computer confirms inventory, checks credit, orders shipment, and initiates the billing process, all in a matter of seconds.

A purchasing agent, meeting with his buyers, queries a computer via a terminal for up-to-the-minute status of pending orders to help arrive at an optimum quantity for a buying decision.

A Working System

The nucleus of Honeywell's transaction processing systems is the executive and message management software.

One such system is Honeywell's Transaction Driven System (TDS). In combination with other interactive processing dimensions, TDS is being used in many businesses today.

When someone needs information, he asks for it at the terminal. TDS manages the request—sending it through the processing, data base access, and communications steps—and responds with the information.

To do all this efficiently takes an integrated software system. In doing the job, TDS interfaces with other key GCOS software components:

- Honeywell's GCOS executive software controls the operation of TDS within a multidimensional environment. It takes advantage of the power of Honeywell's Series 60 Level 66 large scale systems, allowing transaction processing to go ahead concurrently with local batch and other processing.
- The Network Processing Supervisor (NPS) residing in a DATANET Front-End Network Processor handles all the communication line disciplines between the terminal and the information processor. NPS allows configurations ranging from a few to more than a thousand terminals connected at one time with up to four network processors.
- Integrated Data Store (I-D-S) is Honeywell's advanced data base management system. It is used as a subset within TDS to provide immediate access to the data base, while providing data protection.

How TDS Works

TDS prestores processing routines and calls them out when a transaction arrives

These routines (called Transaction Processing Routines, or TPRs) can be written and modified by a programmer, using I-D-S COBOL and simple TDS statements. TPRs can be shared between transactions and thereby provide more effective use of memory.

A transaction begins when data is received in the form of an input message. TDS activates the appropriate routine on the basis of a key contained within the data.

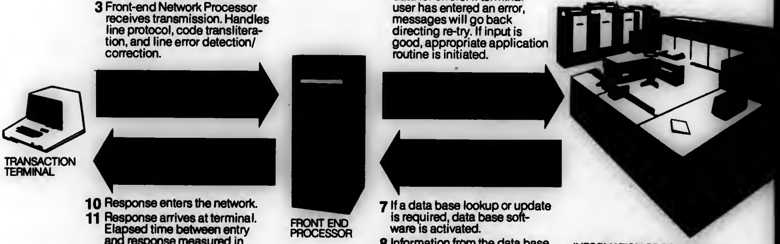
The TPR carries out calculations or retrievals or updates, and responds with the information requested.

Concurrent Access

One consideration in a transaction processing system is how to manage different users accessing the same data base.

TDS solves this with a lock-out at the record level. This means that only one user can access a record at one time, but the rest of the file is accessible to other users so that the data base can serve many users at once.

Step-by-step activities in transaction processing.



1 Terminal user enters data in the remote location.

2 Data is transmitted via network to central processing location.

3 Front-end Network Processor receives transmission. Handles line protocol, code transliteration, and line error detection/correction.

4 Successful transmission forwarded to the information processor.

5 Executive supervisor activates transaction processing executive and allots necessary resources.

6 Transaction processing executive examines transaction data for errors: if terminal user has entered an error, messages will go back directing re-try. If input is good, appropriate application routine is initiated.

7 If a data base lookup or update is required, data base software is activated.

8 Information from the data base forwarded to the transaction processing executive. If transaction generates updated data, it is journalized and sent back to the data base for posting.

9 Front-end Network Processor prepares response for transmission.

10 Response enters the network.

11 Response arrives at terminal. Elapsed time between entry and response measured in seconds.

Integrity

Honeywell's transaction processing system has many features to maintain integritv.

The first level of error detection takes place at the terminal. If the operator sees that an error has been entered, it can be corrected immediately, before transmission.

If a faulty transmission occurs, because of a line problem or any mechanical reason, NPS automatically retries the transmission.

When TDS receives a transmission from NPS, it checks the data for validity. If there is an error—such as an invalid key word—TDS will reply with error messages until the input is corrected.

TDS also journalizes all input on a separate file. This way, TDS can restart any transaction that encounters difficulty, without having the message entered again.

For rapid recovery of the data base, updating data from transactions is also journalized.

Availability

A system that's there when it's needed is essential to a business that depends on the transaction processing dimension for its daily operation. TDS has proven reliability in all key elements of an interactive system: the operating system, the network software, and data base management software.

The availability of Honeywell's Level 66 and DATANET hardware—the efficient use of network resources provided by GCOS, NPS, and TDS—the extensive automatic recovery and restart features of TDS—all help to make sure that processing is available.

These capabilities make information processing power available to people unfamiliar with computers. Through simple-to-use terminals, these people are now able to initiate processing and data base retrieval, and the activities are performed online, at a rate fast enough to satisfy the needs of any business environment.

The Other Computer Company:
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I'm interested in Transaction Processing. Tell me more.

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Multibank/Multiport Memory Marks One of Four DCC Minis

CW Photo by V. Farmer

A stack of new minis decorated Digital Computer's booth at the recent NCC.

FAIRFIELD, N.J. – Digital Computer Controls (DCC) has announced four additions to its Series 16 line of minicomputers.

Three low-end models, the D-216, D-316 and D-416, are available as a computer-on-a-board or as a fully built-up minicomputer. The D-316 and D-416 offer up to 32K words of MOS random-access memory (RAM) or core memory respectively on a single printed circuit board along with the CPU, power monitor/auto restart, automatic program load and a teletypewriter interface.

Byte parity checking is standard on MOS RAM memories. Combinations of mixed programmable read-only memory, read-only memory and RAM are available in the Model D-216.

DCC's high-end offering is the 660 nsec D-616, which is said to feature multibank/multiported memories for the first time in the minicomputer industry. This makes possible simultaneous, full-speed memory access by the CPU and I/O resulting in significant throughput improvement, the company said.

A memory mapping and protection unit allows expansion of the D-616 to 1M 16-bit words of 660 nsec memory.

Other features of the D-616 include memory operation in-line or interleaved, automatic error checking and correction, writable control store, 32-bit wide floating-point hardware and decimal arithmetic options.

The entire family of minis is said to be completely upward-compatible with the firm's present D-116 and D-116H minis. Existing controllers and software developed for the D-116 and D-116H will run with the latest members of the Series 16 family.

The operating systems include RTX, a real-time executive; MSOS, a mass storage operating system designed for real-time and batch operations; and Iris, a business and scientific operating system offering indexed random files, batch jobstreaming with output spooling and multi-terminal support.

Higher level languages include Fortran '74, Business Basic, a Cobol-like formatted output as well as string and matrix processing language and Report Writer, a Cobol-like report generator.

All the machines have an enriched single-word instruction set which has many new classes of instructions including Arithmetic Memory to Accumulator, Arithmetic Memory to Memory, Bit Manipulation Instructions, Multiple Logical/Arithmetic Shifts, Extended Logical Instructions, Move Memory to Memory Instructions, and Byte Manipulation instructions, as well as others, the firm said.

Unsigned Multiply/Divide is standard in the D-216, D-316 and D-416. Both Signed and Unsigned Multiply/Divide options are available in the D-616.

Another new feature is overlapped instruction fetch concurrent with the execution of instructions.

All of the machines feature triple-stack processing coupled with a vectored interrupt system. Interrupt response time is seven to 10 times faster than a D-116 and D-116H, according to the firm.

Each member of the minicomputer series is available in four different slot configurations from 4- to 17-slot chassis. Modular power supplies with thermal protection are featured.

Pricing of the D-216, D-316 and D-416 is "about equal to Computer Automation's LSI-1 in small configurations," the firm said.

Pricing of the 660 nsec core version of the D-616 is about 20% below that of Data General's 800 nsec core version of the Eclipse.

Pricing of the 660 nsec MOS RAM D-616, with or without automatic error checking and correction, is also approximately 20% below that of the 700 nsec MOS RAM version of the Eclipse, the company added.

DCC is at 12 Industrial Road, 07006

HP TV Interface Card Generates Mixed Display

PALO ALTO, Calif. – Under control of the RTE operating system, a single TV interface card plugged into an I/O slot of any Hewlett-Packard (HP) 2100 or HP 21MX-based minicomputer system can generate mixed displays of both graphic images and alphanumeric characters on large-screen, low-cost commercial TV monitors.

With multiple cards, information may be displayed in color or in variable levels of gray on appropriate monitors designed for EIA RS-170 composite video signals, according to the company.

The HP 91200A TV interface kit, which includes the plug-in card, cables, adapters and manuals as well as the necessary RTE driver and library software, allows up to five monitors to be connected in series and placed up to 1,500 feet away from the computer.

With this feature, the same status information can be displayed on both small- or large-screen monitors in many areas of the same facility.

Up to 64K individually addressable points (in a 256 by 256 dot matrix) are displayed from the card's 4K random-access memory (RAM) storage which, unlike scan converters, "provides a highly reliable and long-life display control. As a result, no CPU time is needed to refresh the display and CPU memory dedicated to display storage can be reduced," an HP spokesman said.

The user can program the HP 91200A with high-level Fortran IV, Algol, Real-Time Basic and Assembly language calls to generate variably sized characters, vectors and illuminated areas as well as to erase and update any portion of the picture without having to reenter the displayed information.

The HP 91200A is priced at $3,120 from the firm at 1501 Page Mill Road, 94304.

Printer Handles Micr for Banks

WOBURN, Mass. – Printer Technology's Printec 100M full-character serial impact printer imprints both Micr characters and conventional alphanumeric information during a single pass of the document through the printing process.

Until the present, no printers handled applications that involved variable Micr and alphanumeric printing, according to the firm. As a result, considerable clerical labor has been involved in manually printing this information on payment certifications, checks, insurance forms, financial instruments, etc.

The usual solution has been to pass the document through the printing process twice, perhaps on two different machines, in order to print the magnetically readable Micr and human-readable alphanumeric characters.

Like other machines in the Printec family, the Printec 100M imparts fully formed characters onto the original and carbon copies. Timed and electronically activated "hammers" drive the paper against selected characters on the rotating print wheel. An ink roller keeps the print wheel coated with a thin film of ink.

Printec 100M

The print wheel is provided with two sets of character fonts, one for alphanumeric characters, the other for Micr symbols.

Operating speed for a 13.2-in. line is 13 in./min, rising to 22 in./min for a 7.2-in. line. Paper up to 15-15/16-in.-wide may be accommodated.

The printer is priced at under $10,000 for most end-user applications from the firm at Sixth Road, Woburn Industrial Park, 01801.

Mini Bits

Interfaces Link DEC Machines

PISCATAWAY, N.J. – A set of interfaces designed for high-speed data transfers between computers in multiprocessor or distributed systems applications is available from Computer Interface Systems, Inc.

Designated the IPT-8 and IPT-11, these devices provide parallel memory to memory data transfers at rates up to 500 kbyte/sec between two Digital Equipment Corp. PDP-8/E computers, two PDP-11 computers or between a PDP-8/E and a PDP-11 at distances up to 50 feet. Up to 4K 12- or 16-bit words can be moved in one operation without program intervention, the firm said.

In addition to multiprocessor and distributed systems, these interfaces have found application in systems using PDP-8/A computers as front-end processors for large PDP-11 systems.

Prices start at $990 for a PDP-8/E to PDP-8/E link, $1,950 for a PDP-8/E to PDP-11 link and $2,900 for a PDP-11 to PDP-11 link, including interconnecting cable. The firm can be reached through P.O. Box 08854.

Data 100 Adds Two Printers

MINNEAPOLIS – Data 100 Corp. has introduced 400- and 600 line/min printers, the Models 5540 and 5560.

The impact printers have 132 hammers and a steel character band that moves horizontally.

Controlled by built-in microprocessors which, according to the company, eliminate overshoots and misregistrations by programming the drive motors as paper advances, the printers also monitor the ribbons and skew the drive shafts to compensate for irregular tracking.

List prices of the printers are $8,995 for the Model 5540 and $8,195 for the Model 5560. The firm is at 7725 Washington Ave. South, 55435.

Controller Ties Disks, PDP-11

SCOTTSDALE, Ariz. – International Memory Systems' Model DM100 controller interfaces any moving-head disk drive of either the single or dual disk variety to any of the Digital Equipment Corp. (DEC) family of computers.

It is a direct replacement for any RK-11 system and fully compatible with any of the DEC operating systems such as DOS, RSTS, RSX-11, Mumps or RT-11, the firm said.

The DM100 can accommodate up to eight spindle disks or four dual disks with a total capacity of 10M words and with full compatibility with the latest versions of software used on the RK-11 system.

It also has the capability to handle both the 1,500- and 2,400 rev/min drives in either the 100- or 200 track/in. configurations and offers the PDP-11 user a choice in both data transfer rates and access times.

The variable buffer sizes available allow flexibility in system configuration without the danger of Data Late Timing errors when used with the DEC high-speed peripherals, the vendor said.

Error detection of data is accomplished by a cyclic redundancy code recorded as a checksum at the end of each sector. A disk reversal switch allows either the fixed or removable disk of a dual disk drive to be configured as the system disk under the DEC operating software.

Prices start at $3,250 from the firm at 14609 Scottsdale Road, 85260.

Dial-A-Heart Specialist

MARSHFIELD, Wis. – At the Marshfield Clinic here, a minicomputer-based network has gone into operation for processing and conveniently storing several hundred electrocardiograms (ECG) each day. Approximately 50 to 70 of the ECGs are generated at the clinic itself; the remainder are transmitted over voice-grade phone lines from several "outboard sites" in central Wisconsin.

Developed at a cost of $250,000, the network is intended primarily as a service for local medical agencies which provide the clinic with referrals. Participating agencies pay a minimal charge per ECG for the services of the network and the clinic's seven cardiologists, who "overread" computer analysis of the ECGs to check their validity and to add comments on any abnormalities or situations requiring special treatment.

Systems-engineered by Marquette Electronics, the network centers around an Interdata Model 70 minicomputer and uses the company's Real-Time Operating System (Rots) in a multiprogramming environment. Analysis of the incoming ECGs is done by a Mayo Clinic program designed by Dr. Ralph Eugene Smith.

Although the Mayo program used at Marshfield is the IBM 360 version, according to Marquette systems development manager, Mike Schwartz, the mini executes the routine faster than several different configurations of the much larger IBM mainframe.

Specifically, the Mayo program utilizes 34K bytes of core memory in the Model 70 along with 16 overlays and runs in 15 to 25 seconds. The same program executed on an IBM 360/30, using 64K bytes of core memory, takes 50 to 65 seconds. On an IBM 360/40, the Mayo program runs in 45 to 55 seconds and on an IBM 360/50 in 20 to 40 seconds.

"We can process data faster than we can acquire it," said Schwartz. "We have a software routine to queue incoming ECGs on our Diablo disk, but that capability was designed into the system at a time when we thought the Model 70 would take a minute or longer to run the Mayo program. We now find we don't need a queuing capability."

Millenium Adds Disk Controller

SANTA CLARA, Calif. – A floppy disk controller employing high-speed microprocessor technology has been developed by Millennium Information Systems.

The entire controller is on one printed circuit card containing less than 20 dual in-line packages, according to the vendor.

These features include ease of host computer software integration, a self-diagnostic capability, checks to insure error-free data and a subchannel address capability for controlling a high-speed Centronics printer.

Drives supported are the Shugart 901, the California Computer Products 140 and others. The controller has a standard I/O interface, and a driver flow diagram is available for any CPU.

The controller is priced over $750 from the firm at 420 Mathew St., 95050.

DEC PDP-8 Minis Get DDC Package

MINNEAPOLIS – The P-812 direct digital control (DDC) package from Research, Inc. is said to interface with a Digital Equipment Corp. PDP-8 minicomputer to provide sophisticated instrumentation for direct digital process control.

The P-812 package includes 16 multiplexed low-level analog sensor inputs, expandable by plug-in cards to 256 inputs.

The package also includes a CRT and all-Omnibus interface cards and connecting cables.

The P-812 package costs $11,500, including software from the firm at P.O. Box 24064, 55424.

American Videonetics Slashes Memory Price

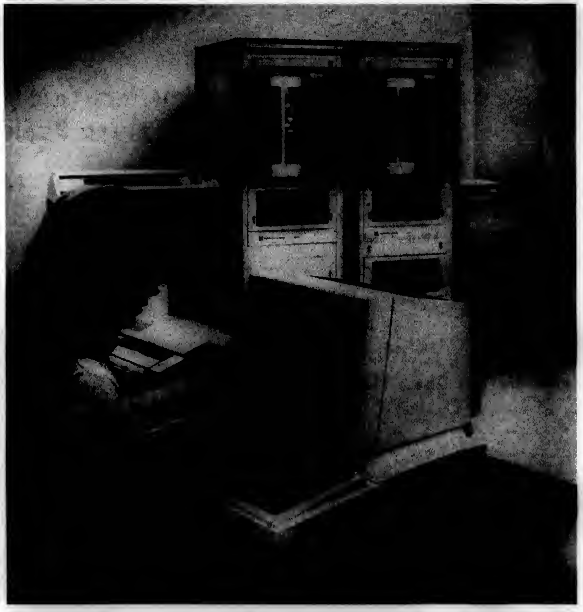
SUNNYVALE, Calif. – American Videonetics has cut the price of its Datacord DI 112 tape cartridge memories from $2,495 to $1,990.

The firm can interface the DI 112 to either the Digital Equipment Corp. PDP-11 or the Data General Nova line, a spokesman said.

The drive is said to offer up to 9M bytes of storage on-line drive. It can transfer data at 200 kbit/sec, the firm said, and maintains low access times with its 240 in./sec search speed.

American Videonetics is at 795 Kifer Road, 94086.

TI announces DXS Data Exchange System...



Improving man's effectiveness through electronics

Low-Cost Console Fits CA LSI Line

IRVINE, Calif. – Computer Automation, Inc. (CA) has a low-cost operator's console which can be used with any member of its LSI family of minicomputers.

Designed for use in environments where a higher-priced programmer's console would be unnecessary, the console gives the user the ability to interrupt and restart operations of the CPU.

The console is configured as a standard front panel with four switches and three lights. The four switches are ENABLE, RESET, START and INTERRUPT. The lights are a power on indicator, run indicator and overflow indicator.

CA Console

Priced at $125, the unit is available from the firm at 18651 Von Karman, 92664.

Shoe Maker 'Keeps in Step' With Nova

LEICESTERSHIRE, England – The manufacture of shoes has changed over the years, and keeping in step with progress has been a problem even for the largest of manufacturers.

Eatoughs Ltd. started manufacturing shoes in the 20s and, though still a family business, has grown rapidly until today it employs some 1,200 people and a minicomputer for production control.

The fashion shoe trade year breaks naturally into two six-month seasons, and purchasing and manufacturing have to take place six months ahead of each season. In preparation for a season, a range of shoe designs has to be created, the designs described in detail in manufacturing terms, and final prices created from these descriptions.

Files Created

The Eatoughs computerized production control system starts with the creation of files containing descriptions of each shoe model and its manufacturing sequence. As many as 1,500 different descriptions may be needed for one season. Each shoe is composed of a number of parts, averaging 26, but sometimes extending to as many as 56.

Prototype shoe models are made in the sample factory for Eatough's sales force to use in the marketing process, and it is at this stage that the designers record the information for each description. This is done through a visual display terminal, which is used in conversational mode. The program used in recording these descriptions has been designed to accept and use abbreviations for any materials, components and operations that are already established within the company.

Orders can vary from 100 pairs of shoes to 20,000 pairs. The Nova splits these across size ranges for effective use in the factory. Each order is then further broken down into batches for delivery and finally into smaller batches that can be handled conveniently on the shop floor.

When the batches have been prepared, the computer – using its product description file – prepares job tickets and stock issue sheets.

True Data Adds Medium Printer

SANTA ANA, Calif. – A medium-speed card reader from True Data Corp., the Model 300, processes 400 card/min.

The Model 300 is the latest member of a line of card readers which use identical primary components. A single rotating drum picks cards, transports them past the fiber-optic read station and stacks them without skewing, flutter or other data-corrupting problems typical of complex, conventional readers, the firm said.

Output levels are transistor/transistor logic signals; others are available as options. The standard output is said to be suitable for twisted-pair lines up to 25-ft long.

Price of the Model 300 is $1,980 from the firm at 2701 S. Halladay, 92705.

Low-Cost Tape Drives Made for DEC, DG Gear

BELTSVILLE, Md. – Computer Operations, Inc.'s Series CO-3000 Linc tape drive sells for $1,995.

The system is plug-compatible with the Nova and Eclipse series from Data General and with the PDP-11 series from Digital Equipment Corp.

The series has redundant phase recording on preformatted magnetic tape at 8,400 byte/sec. Slave expansion drives may be added for $1,395 per drive.

Storage capacity is 335K bytes per drive. The Nova/Eclipse system requires one device slot in the CPU and the PDP-11 system requires one SPC slot.

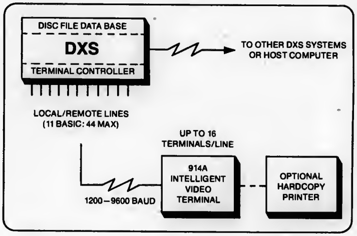
The Model CO-3000D-11 for the PDP-11 includes a built-in read-only memory (ROM) bootstrap and is Dectape-compatible. An RT-11 driver is available as an option, the firm said.

The firm is at 10774 Tucker St., 20705.

the *new* distributed processing system with *two years* applications experience

Distributed data processing…the advanced approach to real-time transaction processing…is not new to TI.

*DXS** Data Exchange Systems already have two years experience cutting EDP costs in applications ranging from inventory control and remote order entry to insurance claims processing. These important cost savings are realized because *DXS* relieves the expensive mainframe computer of communications interrupt loads.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UP TO 16 TERMINALS/LINE
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914A INTELLIGENT VIDEO TERMINAL
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The hardware

The new Model 914A video terminals give the *DXS* user powerful standalone transaction processing and host computer communications through its built-in microprocessor and 3270 emulation. Each basic *DXS* will support up to 64 Model 914A terminals on a combination of up to 11 local/remote communications lines. Not enough? Then, *DXS* is easily expanded to 256 terminals on a combination of 44 local/remote lines.

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The software

System software supplied with *DXS* includes TINDX, a powerful indexed access method of disc file management. A typical data record can be searched and displayed within one to two seconds because no more than two disc accesses are required with TINDX keyed indexing.

DXS/ST, a high-level transaction processing language, permits a relatively untrained programmer to write *DXS* teleprocessing application programs in transaction statements similar to COBOL.

The price

Full system prices range from $66,000 to $250,000, with extended term leases available. Turnkey systems are also available.

The support

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TEXAS INSTRUMENTS
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Ware Duns Koch-Goldwater Bill for Aping HEW Report

By Nancy French
Of the CW Staff

ANAHEIM, Calif. – "When the Health, Education and Welfare (HEW) Privacy Study Committee wrote its report on the use of computers in the Federal Government for then-Secretary of Health, Education and Welfare Elliott Richardson, that team had no idea their words would be blandly adopted in privacy legislation now being considered to apply to the private sector."

Willis Ware

Principles established in that report, which was based on "Federal Government data collection, specifically targeting HEW, were never intended for use in the private sector" without further study, Willis Ware, a member of the original HEW committee who now works for the Rand Corp., told a full house at the recent National Computer Conference here.

Many of those principles have been incorporated in the new Koch-Goldwater bill (H.R. 1984) introduced in the House of Representatives this year.

"We never even solicited much testimony from the private sector during our hearings, we did not examine the role of personal information in the private sector and we made no effort to understand how personal information is exchanged in the private sector," Ware explained.

That responsibility was placed in the hands of a Privacy Study Commission as a result of the Privacy Act of 1974, he said.

In their rush to pass a privacy law, legislators lifted language directly from the HEW report and incorporated it into a federal law that passed at the end of last year – less than three years after the project was begun, Ware said, and "that's some kind of a record on the Washington scene.

"In considering the next move, one must not lose sight of the goal," he warned. It is not to bottle up personal information or to unnecessarily restrict its use, nor is it to impose costly safeguards on organization or hamstring record systems, he said.

"The goal is to achieve a better balance between the citizen and all the record systems that surround him and to assure that his personal information is used in his interest and to his benefit," Ware said.

The goal is also to give the citizen recourse for damages in case he is harmed through negligence or deliberate misuse – to give him some control over the use of his personal information.

The choices, Ware said, are as follows:

- "Do nothing – assuming the situation is acceptable and self-policing is adequate," he said.
- "We might consider a general information liability protection law to give the citizen a legal basis for action in case of harm.
- "Specific targeting legislation such as the Fair Credit Reporting Act could be considered. The final choice, at the opposite end of the spectrum would be a broad omnibus bill such as H.R. 1984, he said.

For Privacy Commission

DP Expert Expected to Be Ford Nominee

ANAHEIM, Calif. – "Selection of President Ford's nominees for the Privacy Study Commission provided by the Privacy Act of 1974 is at the penultimate stage of clearance, and at least one of those nominated will be a well-known expert in the data processing industry," Carole Parsons, a staff member of the White House Domestic Council Committee on the Right of Privacy, told attendees at the recent National Computer Conference here.

The delays in making the selections should be regarded as an indication of the "importance of the matter" rather than misunderstood as indicating any lack of concern, she explained.

Outlining the accomplishments made by the Domestic Council Committee since it was founded a year ago, Parsons cited the 14 privacy initiatives as well as the Family Education Rights and Privacy Act – the Buckley Amendment – which gave parents and students access to school files for the first time while restricting access to third parties, she said. is very good."

Referring to legislation now pending on privacy of criminal records systems, she said "prospects for passage of legislation to protect criminal records this year is very good."

Enthusiasm Not Matched

Parsons' enthusiasm was not mirrored by panel member William Fenwick, however. Charging that "too much room has been left for interpretation in both existing and proposed privacy legislation," Fenwick, criticized definitions as "vague."

An attorney with Davis, Stafford, Kellman and Fenwick in Palo Alto, Fenwick cited the word "system" as an example. "You people have been arguing about what the word 'system' means for 10 years. Now the legislators have gotten hold of it and they're going to argue about it for another 20 years, and then the courts will get it and take about 40 years to figure it out."

"Is your employee record system one system or are payroll, company profit-sharing and insurance, for example, all separate systems?" he asked. Depending on how that question is answered, the user may have to keep records on those "systems" each time someone accesses any one of them, he said.

If they are considered separate systems, then "access" will become "transfer" which requires different safeguards, he said. The Koch-Goldwater bill, now under consideration by the House of Representatives, would require that records of the name, address, purpose, data accessed and date of that access be kept.

"Think of what that means to sequential processing. Every time you read in a record, you have essentially accessed that record," Fenwick said.

"Pretty soon access records will take up more space than the records themselves," he quipped.

File access and challenge privileges for the public is another serious problem, he said.

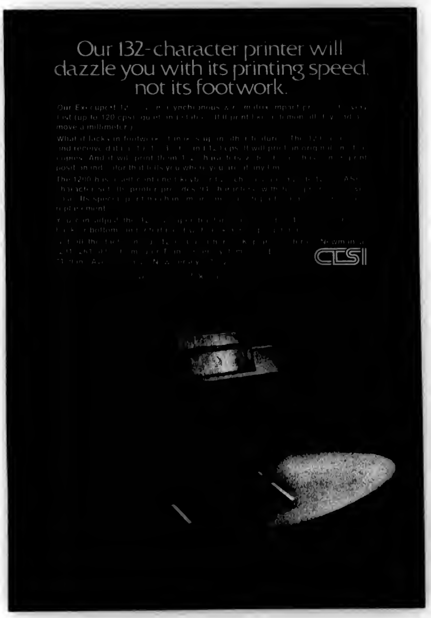
The Koch-Goldwater bill would require the user to create a new file with all the information from every other file so it could be accessed via CRT, he said.

"Unfortunately, the Health, Education and Welfare report on privacy was received by legislators with more enthusiasm than the Ten Commandments by Moses. When Moses got the Ten Commandments, God said they applied to everyone."

By contrast, when HEW Published rules for information practices, it didn't realize the needs of government and the private sector were very different.

"The government is in the business of collecting large amounts of data, and people who tried to refuse to provide that information during the last census found out just how important that data is to the government," he said. They went to jail.

The private sector, on the other hand, is in the business of distributing goods and services, and most private-sector information is collected to satisfy those requirements. "It's far too expensive to maintain inaccurate or unused records," he said.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Breakup of IBM Unpopular Idea

Vendors Prefer Coping With One IBM Instead of Many

By Toni Wiseman
Of the CW Staff

ANAHEIM, Calif. – On the day that marked the beginning of the IBM-Justice trial which will decide whether the giant will be broken up, manufacturers interviewed on the exhibit floor at the National Computer Conference unanimously said they don't want IBM split up.

One often-voiced opinion was that if IBM were broken up, the industry would be faced with the prospect of competing with several IBMs.

Others felt that IBM has done a lot for the industry and still sets the standards by which others have to live, a sure means of keeping up the level of competence and standards.

And, finally, there were those who, having no monetary or business bias in the outcome, still thought IBM should remain intact because it is a good company and no one should be punished for being the best.

Bruce Chrane, director of national sales for Prime Computer, and Ronald Meyers, marketing vice-president for Harris, both thought IBM is more vulnerable the way it is now.

"If you break IBM up, you'll still be left with three, four or five major competitors, all with strong market shares, and they'll all be IBM," Chrane said, admitting he was a relatively disinterested party since "IBM doesn't really want a commanding place in the minicomputer market."

"We sell pretty effectively against IBM now," said Paul Eisner, General Automation's manager of sales promotion, "and it can't afford to get any bigger in terms of the areas it serves.

"Take the 1130 replacement companies, for instance. Today, they can always find a niche, a crack in the IBM wall and fill it. If IBM is broken up, 1130 replacement-dependent people will be in bad shape.

"Anyway, I hate to see IBM punished for being such a good company," Eisner said.

Ed Marinaro, head of marketing at Modular Computer Systems (Modcomp), agreed and went a step further into hypothetical results. "IBM has been damn successful and I hope that doesn't mean that, if Modcomp is successful, the government will try to break it up."

Marinaro, an ex-IBMer, said the company had done a lot for the industry.

"People get in trouble when they try to imitate IBM," he said. "If they are smart, though, and offer a better or alternative product to IBM offerings, they can succeed in beating IBM."

Others in the industry didn't want to see the status quo disturbed. These included Richard Schwab, executive director of marketing for Decision Data, and Bob Adams, Xerox vice-president of marketing.

"IBM is a known quantity and that we can fight," Schwab commented. "As long as we know what the other guy is doing, we're okay. If IBM is broken up in a number of separate parts, it'll be harder to keep tabs on it.

"It's a naive view to believe IBM will lose control of the industry if it is broken up; you can't break up talent," Schwab said.

Adams didn't want to see IBM split up either, because he "understands the market the way it is now and can operate in it successfully, so why change?"

George Toor, Wangco vice-president of marketing, said "IBM fostered the growth of companies like Wangco.

"Besides," he added, "competition is healthy for business; it gives the industry credibility which is in the best interest of everyone."

Should the split-up be inevitable, however, Toor would like to see IBM split into categories of computers" so that it would have to compete in a specialized computer business, rather than in services, peripherals, software, etc."

Ralph Gabai, marketing vice-president for Pertec Corp.'s Peripheral Equipment Division, didn't feel that an IBM breakup would have much impact on his particular business except in the kinds of peripherals and technology each new IBM segment might go on to develop independently.

Separate Financial Strength

Datapoint's director of sales support, Lloyd Schiller, said he doesn't want to face the prospect of six separate IBMs but, if it is inevitable, he opined he'd like to see the financial end broken off first, in order to bring about more competitive pricing of data processing equipment.

The General Systems Division is almost

(Continued on Page 36)

Antitrust, Regulation Called 'San Andreas Fault'

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – Antitrust and regulatory issues are the San Andreas Fault beneath the DP and telecommunications industries as they are known today, attorney J. Thomas Franklin told a recent NCC session on antitrust and regulatory aspects.

"Today there is a greater likelihood than at any time in several decades that legal actions in the courts and before regulatory agencies will rend basic changes in the structure, marketing patterns and future developments of these industries," he said.

Monopoly or near-monopoly has been the traditional structure of both the DP and telecommunications industries as they have been known, he said. Not only is this structure likely to change, but the difference will bring "a basic change in the marketing of new technologies," Franklin said.

The challengers to the present arrangement claim users ought to be offered "new technology from a variety of sources on competitive terms and from vendors of competitively balanced financial and marketing strength," he said.

Franklin listed some of the "enormous markets, products . . . or technologies, which right now are under antitrust challenge as monopolized, noncompetitive or otherwise in need of fundamental restructuring."

In the DP industry, there are major antitrust challenges to the "manufacture and marketing of general-purpose data processing systems, the risk-lease marketing of such systems and the manufacture and marketing of add-on memories, peripheral products and terminal products," he said. More are likely later this year, he added.

Within the telecommunications industry, communications satellites, microwave common carrier networks and value-added networks are under antitrust challenge.

"So are the telecommunications terminal and interconnect industries" as well as AT&T's Long-Lines Division, Western Electric, Bell Labs and "the local operating company relationships with AT&T itself."

Shift in Attitudes

The DPer may argue that IBM and AT&T seem to attract antitrust suits almost as a price of their success, Franklin observed. However, the situation differs in 1975 because of the shift in public and political attitudes toward the nation's business structure and the significance of antitrust legislation, he said.

Not since the early years of this century has the image of big business and big corporations in this country been so tarnished, he said.

Sooner or later, public attitudes will affect action by Congress, the courts and regulatory agencies, he said. Congress adopted the first major change in antitrust legislation in 25 years with the Tunney Bill, he noted.

Senators Hart and Scott have introduced "The Antitrust Improvements Act of 1975" that would make even greater changes, he said.

Among other signs of the shifting attitude, states are repealing fair trade laws and Congress is considering the same thing, he said.

The President and Attorney General now "pledge their undying dedication to stricter enforcement of antitrust laws and credit many of our current economic problems to their previously lax enforcement," he said.

In July, the Department of Justice will publish "a 10-page consumer guide to antitrust enforcement suggesting how John Q. Public can recognize a monopolist or would-be monopolist, price fixer or other antitrust violator if he stumbles onto one," Franklin said.

For users, all this means "an unprecedented opportunity to improve freedom of choice among competitive products and services. But users should also learn their rights under the antitrust laws," he said.

"The user can act by objecting to vendor practices he feels are monopolistic," Franklin said.

There is also a very good chance the user can find someone already litigating the same issues who will be interested in the facts of another case, he added.

"The Federal Trade Commission, the Antitrust Division of the Department of Justice and any of the private parties now involved in litigation with IBM and AT&T will be delighted to receive more grist for their mills," he said.

If the cases are the same, and they win theirs, "then your problem will be solved at their expense – which is a pretty neat trick," Franklin remarked.

DP Industry in '76 Seen Faring Better Than Most Sectors

By Patrick Ward
Of the CW Staff

ANAHEIM, Calif. – The DP industry ought to fare better than most others in 1976, "which looks like a year of modest recovery," Walter Hoadley, chief economist and coordinator of planning for the Bank of America told a luncheon audience at the recent National Computer Conference here.

"At some time in '76 we might get back to where we were in '73," he said. As confidence returns, the nation could advance toward a major economic boom, but that would carry the risk of renewed inflation and shortages, he said.

"Inflation should be around 6% by the end of this year and it will probably remain at about that level through 1976," he said in a subsequent news conference.

"We still don't have any sign of that turn in confidence in the industrial community," he said. "Your very future depends on a change in this attitude."

The DP area has "as much support in the board rooms as any other, but it's caught in a wait-and-see attitude," he remarked.

Questioned on the impact of electronic funds transfer systems (EFTS) on American banking, he said EFTS usage "is related to what people want and expect."

"We can't shove something down people's throats," he said. Rather, the spread of EFTS must come from the marketplace backwards.

IBM May Choose to Divest Self Voluntarily Before Court Order

By a CW Staff Writer

ANAHEIM, Calif. – There is a good likelihood within the next year IBM management will conclude that divestiture planned by IBM management is better than divestiture planned by the Antitrust Division of the Department of Justice and Judge Edelstein," J. Thomas Franklin told attendees of the recent National Computer Conference.

Franklin, an attorney who was formerly general counsel for International Data Corp., an industry market-research firm, stressed that the Justice Department has requested IBM be broken up into "several discrete, separate, independent and competitively balanced entities capable of competing successfully with one another."

Franklin said he feels the Justice Department will accept a settlement only if it includes some significant restructuring of IBM, that is, divestiture.

Such a divestiture would not necessarily harm IBM customers, employees and stockholders, he said.

"Indeed, I believe a very strong case can be made that divestiture or restructuring of IBM, particularly if it brought an end to antitrust cases and costs, would be very much in the interestes of each of those parties," he said.

Although he declined to make any predictions on the trial's outcome, Franklin indicated he feels the Justice Department is in a stronger position than it may seem.

IBM has already lost a very important skirmish in the battle so far, he said. It has been ordered to turn over some 1,200 documents to the Justice Department that IBM had claimed to be privileged.

The legal resources of IBM and the Justice Department have often been compared, to the Justice Department's disadvantage, he said.

But, "it is significant in my view that, in the most important showdown to date, [the Justice team] has won in the District Court, the Court of Appeals and the Supreme Court."

Franklin also feels the Justice Department has a case IBM takes quite seriously, "despite its broadside attacks."

NCC Vendors Gratified by Attendance, Format of Show

By Nancy French
Of the CW Staff

ANAHEIM, Calif. – The 278 equipment suppliers that participated in the National Computer Conference this year despite the recession gave the conference high marks in spot interviews on the floor.

All were delighted with attendance figures that, according to the American Federation of Information Processing Societies (Afips), reached more than 34,000 by the fourth afternoon of the conference. The vendors reaffirmed their approval of Afips' once-a-year, floating location formula for a number of reasons.

Jack Sandahl of Decision Data said one national show "provides a better turnout of vendors as well as participants."

Al Lanoil, account manager for Bell and Howell, agreed, calling this year's show "fantastic, with crowds much hetter than anyone anticipated. The old twice-a-year format diluted the show," he explained.

Prime Computer's Bruce Chrane, who used to call himself "the most negative NCCer," said he is now a believer.

"I haven't seen a show with this quality of attendance since the mid '60s, other than the vertical market shows," he said. "This is the best NCC since 1967 or '68.

"I thought we'd get about 10,000 people here this year – most of them tire kickers. I never dreamed we'd get a turnout like this," he added.

George Wagner, director of marketing at Ball Brothers Computer Corp., said that "since Afips replaced the Spring and Fall Joints with one annual conference, the show has been enriched with the participation of many new, smaller companies that couldn't afford to participate twice a year."

Not a Mainframe Show

Many observed it was not a mainframe show, but rather a minicomputer and peripherals show and attributed the good turnout to an industry trend rather than show location or frequency.

Dennis O'Donnell, manager of western sales for Interdata, called the show "outstanding." By noon of the show's fourth day, O'Donnell reported, more than 1,000 visitors had stopped at the Interdata booth – many of them foreign visitors as well as individuals from all over the country.

"Budgets must not be as tight as everybody says," he remarked.

Jeff Blossey of American Telephone and Telegraph Co. said "there are more upper-echelon people here than usual. So many name tags bear the title 'vice-president' and even 'president'," he remarked.

"We're getting a good response when we tell our story," he added.

James Roman, exhibit manager of the Eastman Kodak Business Systems Marketing Division, said "we've been making contact with a lot of people who are asking a lot of good questions. People are looking for new products – alternatives to paper – and many are attending our presentation on microfilm."

Roman, who was equally pleased with the turnout at last year's Chicago exposition, rated Anaheim "about the same and offering lots of success. We'll be back for another round next year."

Hall Worthington, director of marketing product support at Storage Technology, Inc., said that although he personally would have preferred an East Coast location this year since most of the company's end-user business is there, the Anaheim show was "giving us a lot more OEM exposure and this is an important 25% of our business."

Bill Chambers, Pertec's general sales manager, said Pertec would surely participate again next year, regardless of the location.

"Compared to New York and Chicago, Anaheim is surely the best location for the NCC," he said.

"You get much better attendance here because expenses are relatively low, and you don't have to battle any inner city problems," he pointed out.

Gary Ellis, national sales manager at Ingersoll Products, said he was more than satisfied with the number and quality of attendance the show generated.

"Chicago was good, but this show has been much better than we even anticipated," he said.

Do you get most of the trade magazines and still don't always have the facts about your market?

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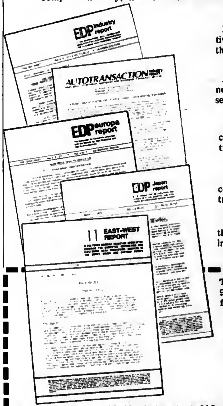

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Manufacturers Prefer One IBM, Not Many

(Continued from Page 35)

a separate company now," he said. "It's gone through all sorts of gyrations to get it that way, and it's still successful."

Although opposed to splitting up IBM, Roy Wigginton, Storage Technology Corp.'s vice-president of marketing, said if IBM has to be broken up "I'd like to see the peripherals group separated from the mainframe section and then it could spin off software.

"But it's difficult to envision such a possibility," he said.

"Currently, because of its total revenue, IBM can afford to do things in the peripherals area, for instance, which it couldn't if that sector were dependent solely on itself for R&D revenue.

"But with total IBM revenue at each area's disposal, it can zero in on developing areas where it faces the most competition," Wigginton decided.

"But," he added, "competition has been extremely healthy for the Industry as a whole. The fact that the price of tape drives has dropped from $1,020/mo in 1970 to where it is today is not due to the goodness of anyone's heart, but rather to the effects of competition."

Contracts

Compuscan, Inc. has been awarded a $6.2 million contract for OCR equipment and editing terminals over a period of three years from Crossfield Electronics.

McDonnell Douglas Automation Co. has received a contract from the Societe Nationale des Petroles D'Aquitaine to design a DP center.

Stansaab Elektronik AB has been awarded a contract from the Greater Stockholm Passenger Transport Co. to develop and manufacture a traffic control system for city buses on five inner-city routes.

The Kennedy Co. has received a contract from Communications Group, Inc. for Model 9800 tape transport systems to be used in telecommunications systems.

This Year's Caravan Exhibitors Pleased With Exposure, Leads

By Nancy French
Of the CW Staff

SAN FRANCISCO – Most Computer Caravan exhibitors interviewed at the conclusion of the traveling show here recently agreed the investment in the nine-city exposition brought them high-quality leads, increased user exposure and a chance to talk to potential customers who, in some cases, had never heard of their products before.

Sid Haw, sales representative for ICC Milgo, said the show not only helped build awareness in the user community, but also "helped cement relations with present customers.

"Where else can I get all my new products in one location and let prospective users play with them? On a sales call the most you can do is show customers a few brochures," he said.

Richard Falzone, senior sales representative at Memorex Corp., agreed, adding "It's also a good way to see people from some of the smaller installations.

"Our direct sales force does a good job of reaching the large installations that generate the bulk of the company's orders, but it's harder to cover the smaller firms," he explained.

Falzone said the quality of the leads was excellent. People come here for one reason – they're interested in buying.

"We have two relatively new products on display which many users have bought from other manufacturers and didn't even know Memorex had them," he said.

Bill McCluskey, marketing representative at Prime Computer Co., said "we've had nothing but good results" with the Caravan.

Good Visibility

"After seeing Prime equipment, four or five users who had never even considered Prime before are showing strong interest in our system, and that's great," he said. "The show has given us lots of good visibility."

Norman Goldman, western regional manager of Lockheed Electronics, said "this is the only show of it's kind where you can attribute actual sales to the show. But I think we blew it by not going to Los Angeles.

New York was a good city, and Hartford, Philadelphia and Seattle were all a big surprise in terms of quantity and quality of attendees," he said.

Like all advertising media, "the show may not be good for all vendors, the Lockheed booth staff agreed.

"You have to match the product and the user," it said. "That's the whole secret."

Fran Willis, national sales manager of Omnitec Corp., a manufacturer of acoustic couplers, said, "We're looking for a specific kind of user – mostly time-sharing systems users, and the show is great for us."

Quality High

"In Atlanta and Philadelphia we actually made sales at the show. We've found the quality of attendees very high," she said.

There was some disagreement on the buying power of attendees. "I think decisionmakers are getting pretty low in companies today. It's strange though, a lot of people have authority to spend $50,000 on equipment but yet they can't get travel authorization to go look at the gear, John Usher, district manager of Varian Data Machines, said.

"I think the Caravan helps the whole industry because it brings the computers to the people," he said.

But Peter Johnson, manager of market development for Basic Timesharing, said "I think the show draws a lot of people with limited purchasing authority – $5,000 to $10,000. They're looking for small articles like terminals. I don't think they're really here to look at big systems," he pointed out.

Usher said he would recommend participating in the Caravan again. "Ten or 15 solid leads more than pay for it," he explained.

Bill Tilley, sales manager at Computer Devices, Inc., a manufacturer of portable terminals, noted the criteria of success in the Caravan is changing for his firm.

Way to Get Exposure

"When we were a small company with a small sales organization, the Caravan was a great way to get exposure – especially with potential salesmen and representatives.

"But now that has changed, and we have to look at the Caravan from a different perspective.

"To make it worthwhile to us today, we have to be able to relate it to tangible new business, not just exposure any more," he explained.

Richard R. Lee Jr., sales representative for Control Data Corp., was "disappointed that more big companies such as Univac, Honeywell and Burroughs weren't represented. We got some good leads," he said.

Gary Elm, Martin Marietta Co. director of marketing services, said "the show will pay off," but suggested there may be a need for two shows – a hardware show and a separate applications-oriented show.

Fran Willis

CW Photos by N. French

Richard Falzone

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Orders & Installations

The state of California has ordered a Varian V72 minicomputer to aid in drafting new legislation and maintaining state codes.

Data Communications Corp. has installed a Burroughs B6700 dual processor system as part of an on-line inventory control system.

Florida Power and Light Co.'s Miami Dispatching Center has installed its third in a series of computer-directed, Supervisory Control and Data Acquisition (Scada) systems from Moore Systems, Inc.

The Problem-Oriented Medical Information System (Promis) Laboratory at the Medical Center Hospital of Vermont has ordered a Varian V74 computer as part of a coordinated health-care information system.

The *Joplin Globe* will install Digital Equipment Corp.'s Decset-8000 typesetting system.

Guaranty Bank and Trust Co. has installed a Burroughs B1714 system.

The Chambersburg (Pa.) *Public Opinion* has ordered a Star/Xylogics 700 series copy processing system from Dymo Graphic Systems, a subsidiary of Dymo Industries, Inc.

The city of Plano, Texas, has ordered a Hewlett-Packard HP M/260 data base management system to process municipal functions ranging from payroll to water billing.

Calcasieu Marine National Bank has installed five NCR 770 self-service financial terminals and 18 NCR proof and encoding systems.

Diablo Sales Seen Stabilizing After Five Years' Rapid Growth

By Nancy French
Of the CW Staff

HAYWARD, Calif. – Diablo Systems' sales for 1975, which have doubled every year since the firm's inception in 1969, will not continue on that growth path, said John Scandalios, vice-president of marketing, in a recent interview here.

Diablo's sales level has stabilized at last year's average, he explained, after two cutbacks last year and a 15% layoff in March. Orders began stretching out in December and just recently have begun to pick up, he said.

During last year, November was the best month in the company's history for shipments and earnings, he added.

Unlike the lease-based market, the OEM market is quite volatile and is severely impacted by an economic slump. OEMs "simply don't get that sale," Scandalios said.

CW Photo by N. French

Diablo Printers in Oven

"We don't get the markups IBM gets, but we're set up to work on a smaller profit," he said. "IBM maintains a good price structure for competitors," he added.

"A company with a good business organization and a good product should continue to stay in business, cofounder George Comstock said.

"It is not our mandate to get into the end-user market," he added.

"Right now the OEM market is growing very rapidly, and to make the most of it merits our full attention.

"Getting into the end-user business would require us to have leasing plans, a massive sales organization, a service organization and a big involvement in software," he said.

The industry's biggest problem, according to Comstock, is the "dramatic increase in demand for product. Too much pressure causes companies to take shortcuts."

The tremendous growth rate "keeps a guy running so fast he stubs his toe, and the one who succeeds is the one who recovers fastest," Comstock remarked.

Diablo's customer base is comprised principally of small systems builders specializing in billing and accounting, word processing, dedicated data entry and data collection and process control, Scandalios said.

Three Key Criteria

Customers are looking for three key criteria in an OEM supplier. The first is "product reliability and serviceability. Next, they are looking for a supplier with stability and sound management," and, finally, they are concerned about "price," Comstock said.

In 1969, when minicomputer peripherals makers were emphasizing expensive, dual disk drive systems, Dr. Andrew Gabor and Comstock formed Diablo Systems to sell a single disk drive to store the same data with half the hardware at half the cost.

Today, thanks to the Model 31, Diablo Systems, a wholly owned subsidiary of Xerox Corp., is one of the largest OEM suppliers of peripherals.

Although Comstock wouldn't discuss numbers, competitors estimate Diablo has made 65% of all minicomputer disk drives installed, 85% of which are Model 31s.

"We started this company July 1, 1969, with the Series 30 disk drive, comparable to IBM's 2315. In mid-August of that year, IBM introduced the System/3, utilizing the 5440 drive, and immediately we had to begin developing a second product," he said.

But the biggest piece of good luck Diablo has had to date occurred with IBM's introduction of the System/32.

"For the first time, IBM has put its stamp of approval on distributed intelligence. They finally have broken with the tradition of a core of specialization, the mystique of the large central computer site with its programmers and analysts," Comstock said.

Little things that count.

Read all about them in our June 25th supplement, "Minicomputers and Small Systems."

Minicomputers are getting bigger and smaller than ever these days, and they are subject of a special report in the June 25th issue of *Computerworld*. Edited by Vic Farmer, this special supplement will focus on problems and solutions in minicomputer applications and system integration. Drawing on the real-world experience of other users in situations like your own, special emphasis will be given to money-saving ideas. You'll see application stories and tutorials on topics like these:

- **The benefits and drawbacks of time sharing on a large system versus owning a small minicomputer system.**
- **How to recognize and solve problems in interfacing and system integration.**
- **When to call for help - minicomputer consultants and outside software packages.**
- **Satellite system networks - minicomputers as processors in data networks.**

If you're using minicomputers or are considering one, you should be reading this special report in the June 25th issue of *Computerworld*. And if you're a marketer in the minicomputer industry, your ad should be there. Ad closing is June 6th. For complete details, contact your area *Computerworld* representative. Or call Judy Milford or Sara Steets at (617) 965-5800.

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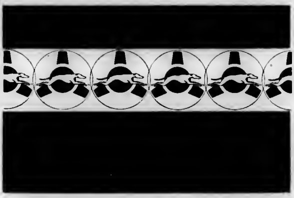

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240K, 3330 (4m), 2314 (8m), 6 3420-5 d.d. tape

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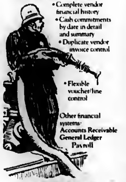

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Two of Three Mini Makers' Results Improve

Two minicomputer makers, Modular Computer Systems, Inc. (Modcomp) and Systems Engineering Laboratories, Inc (SEL), reported improved operating results for the most recent period but Microdata Corp.'s earnings sagged.

SEL managed to reduce its operating losses for both the quarter and nine months ended March 28.

During the third quarter, SEL lost $80,847 or 3 cents a share compared with earnings of $1.2 million or 47 cents a share, which resulted from a $1.3 million special credit. In the 1974 period, SEL's operating loss was $140,276.

Revenues climbed slightly to $4.2 million from $4.18 million in the year-ago period.

During the nine months, SEL reduced its loss to $289,157 or 11 cents a share compared with $3.6 million or $1.38 a share.

Revenues increased to $13.2 million compared with $10.1 million in the year-ago period.

Modcomp scored record revenues for the first quarter ended March 31.

Revenues jumped to $8.7 million compared with nearly $5 million in the year-ago period. Operating income grew, but earnings were $548,000 or 21 cents a share compared with $591,000 or 23 cents a share, including a $188,000 tax credit.

Microdata Earnings Drop

Microdata Corp.'s six-months earnings sagged drastically to $45,959 or 3 cents a share compared with a restated $454,011 or 29 cents a share.

Six-month revenues rose to $6.9 million compared with $5.7 million in the year-ago period.

Quarterly revenues at Microdata eked upward to $3.4 million compared with $3.2 million while earnings were off to $193,664 or 12 cents a share compared with $269,998 or 17 cents a share in the year-ago period.

Microdata decreased its inventory during the six months by $700,000 and accounts payable by $1.8 million as part of a campaign to strengthen the balance sheet.

Boothe Reports Profit for Quarter

SAN FRANCISCO – Boothe Computer Corp. reported a profitable first quarter and completion of finance agreements.

During the quarter, the firm earned $59,000 or 2 cents a share compared with a loss of $873,000 or 41 cents a share in the year-ago period.

Revenues grew to $12.3 million compared with $11.6 million in the first quarter of 1974.

Chairman D.P. Boothe Jr. said the current activity and general business climate for the Computer Leasing Group gives reason for cautious optimism.

There has been a recent firming of rental rates coupled with a much reduced rate of turnover of equipment which, if sustained, will have a positive effect on cash flow and the possibility of reporting near term earnings, he said.

Maximum Capacity

Courier Terminal Systems' orders have increased to where the subsidiary will be operating close to maximum manufacturing capacity, he said.

Boothe anticipates the unit will report profits in the second quarter and thereafter.

While Boothe Airside Systems had an excellent first quarter, Boothe warned the subsidiary's performance should be judged on an annual basis.

PSC technology also turned in earnings.

The financing completed involved an agreement with Financeamerica to retire $31.7 million of debt for $24 million cash, and payment is expected to be made by June 15.

Boothe will borrow $18 million in cash from a group of lendors, sell about $3 million worth of equipment to Decimus Corp., and generate the remainder, the firm said.

The financing will reduce total debt by more than $13 million and increase stockholders equity by more than $7 million, said Boothe.

CSC Doubles Earnings for Year; NCSS Shows 38% Revenues Growth

Two large services firms, Computer Sciences Corp. (CSC) and National CSS, (NCSS), Inc., reported increased revenues for 1975.

CSC managed to double its annual earnings, while those at NCSS lagged behind because of the absence of a tax credit.

CSC's earnings, bolstered by a contribution from Infonet, rose to $3.6 million or 26 cents a share compared with $1.6 million or 12 cents a share in the year ended March 29, 1974.

Revenues grew to a record $177.4 million, up 21% over last year, with nearly $147 million.

Infonet, a nationwide timesharing service, generated revenues of $37.9 million, up 65% over $23 million in 1974.

During the fourth quarter, CSC earned $1.3 million or 9 cents a share compared with $518,000 or 4 cents a share in 1974. Revenues grew to $49.3 million compared with $40.8 million last year.

At NCSS, revenues grew 38% to $32.6 million compared with $23.7 million for 1974. Earnings totaled $1.8 million or $1.67 a share compared with a restated $2.1 million or $1.91 a share, including a $519,000 tax credit in 1974.

During the quarter, revenues rose to $7.9 million compared with $6.8 million in 1974, but operating income lagged behind that of last year.

Earnings totaled $447,132 or 41 cents a share compared with $582,666 or 52 cents a share, including a $129,975 special credit, during the year-ago period.

Expansions

IBM will build a 167,000 sq-ft computer assembly plant in the Bedford Stuyvesant section of Brooklyn, N.Y., which will replace an old plant located near the site.

Basic/Four Corp. has acquired its fourth facility in Orange County, Calif., and will headquarter three departments there: product development, advanced development and technical support.

The Education and Training Division of Boeing Computer Services has opened a computer training center at 825 Third Ave. in New York City.

McDonnell Douglas Automation Co. (Mcauto) has opened its twenty-third batch station in the U.S. at 608 Second Ave., Minneapolis, Minn.

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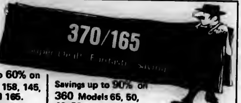

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Earnings Reports

PIONEER SYSTEMS
Three Months Ended March 1

	1975	1974
Revenue	$11,839,000	$10,492.000
Disc Op	.....	(9,000)
Loss	781,000	313,000

WANG LABORATORIES
Three Months Ended March 31

	1975	1974
Shr Ernd	$.04	$.29
Revenue	17,171,000	16,027,000
Earnings	170,000	1,168,000
9 Mo Shr	.44	.74
Revenue	50,935,000	43,851,000
Earnings	1,785,000	2,988,000

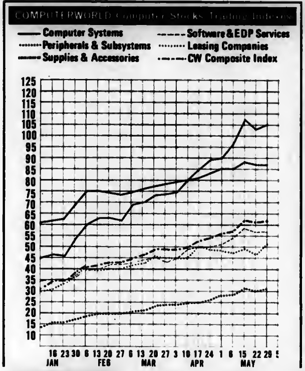
GREYHOUND COMPUTER
Three Months Ended March 31

	1975	1974
Shr Ernd	$.01	$.10
Revenue	15,832,000	12,794,000
Earnings	49,000	438,000

RAPIDATA
Three Months Ended March 31

	1975	1974
Shr Ernd	$.19	$.04
Revenue	3,597,328	2,886,997
Earnings	a349,836	80,565

a-Includes one-time sale of software to a computer equipment vendor for about $58,000.



PERTEC
Three Months Ended March 28

	1975	1974
Shr Ernd	$.23	.....
Revenue	12,990,000	$8,351,000
Disc Op	.....	(517,000)
Earnings	859,000	(285,000)
9 Mo Shr	.59	.12
Revenue	34,530,000	23,473,000
Disc Op	.....	(1,041,000)
Tax Cred	.....	262,000
Earnings	1,819,000	376,000

ENNIS BUSINESS FORMS
Year Ended Feb. 28

	a1975	1974
Shr Ernd	$1.54	$1.03
Revenue	58,919,288	49,657,133
Earnings	3,579,862	2,443,914
3 Mo Shr	.25	.24
Revenue	14,037,924	13,098,820
Earnings	565,503	565,190

a-Reflects change to Lifo accounting method.

SPERRY RAND
Year Ended March 31

	1975 (000)	a1974 (000)
Shr Ernd	$3.81	$3.38
Revenue	3,040,862	2,613,466
Earnings	b131,420	116,409
3 Mo Shr	1.11	1.00
Revenue	823,237	724,439
Earnings	38,425	34,679

a-Restated. b-Includes a gain of $5.4 million on sale of surplus land.

ADVANCED MEMORY SYSTEMS
Three Months Ended March 28

	1975	1974
Shr Ernd	$.16	$.11
Revenue	7,681,000	9,075,000
Tax Cred	210,000	102,500
Earnings	439,000	213,600
6 Mo Shr	.30	.13
Revenue	15,184,000	16,450,700
Tax Cred	360,000	117,500
Earnings	745,000	244,800

SINGER
Three Months Ended March 31

	a1975 (000)	e1974 (000)
Shr Ernd	.....	$.88
Revenue	$669,537	646,219
Loss Disc Op	.....	3,235
Earnings	(3,695)	16,677

e-Foreign exchange adjustments reflects an after-tax loss of $3.1 million in 1975 and $1.7 million in 1974.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 28, 1975

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCN		1975 RANGE (1)	CLOSE MAY 28 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	82-108	101 1/2	+ 3/4	+0.7
O	COMPUTER AUTOMATION	2- 8	7 1/8	+ 1/2	+7.5
N	CONTROL DATA CORP	11- 23	21 1/2	- 1/4	-1.1
N	DATA GENERAL CORP	10- 33	28 1/2	0	0.0
O	DATAPOINT CORP	6- 21	20 3/4	+1 1/2	+7.7
O	DIGITAL COMP CONTROL	1- 3	3 1/4	+ 1/4	+8.3
N	DIGITAL EQUIPMENT	46-111	107 1/4	+3 1/4	+3.1
N	ELECTRONIC ASSOC.	2- 3	3 3/8	+ 1/8	+3.8
A	ELECTRONIC ENGINEER.	5- 10	8	-1	-11.1
N	FOXBORO	23- 37	35 1/2	+ 1/2	+1.4
O	GENERAL AUTOMATION	6- 11	9 1/4	+ 1/2	+5.7
O	GRI COMPUTER CORP	1- 1	7/5	0	0.0
N	HEWLETT-PACKARD CO	58-110	110 1/4	+5 3/4	+5.5
N	HONEYWELL INC	22- 38	38 1/4	+5 1/4	+15.9
N	IBM	138-224	213 3/8	+ 5/8	+0.2
O	MEMOREX	1- 10	8 1/8	+1 1/8	+16.0
O	MICRODATA CORP	2- 4	3 3/4	- 1/8	-3.2
O	MODULAR COMPUTER SYS	0- 18	15 3/4	- 1/2	-3.0
N	NCR	15- 37	36 1/2	+ 3/8	+1.0
N	PERKIN-ELMER	0- 29	26	+ 7/8	+3.4
N	RAYTHEON CO	26- 47	46 7/8	+2 1/2	+5.6
N	SINGER COMPANY	0- 16	14 3/4	+ 1/4	+1.7
N	SPERRY RAND	28- 47	43 3/8	-1 7/8	-4.1
A	SYSTEMS ENG. LABS	1- 4	3	- 1/4	-7.6
O	ULTIMACC SYSTEMS INC	1- 8	5 1/2	- 1/8	-2.2
N	VARIAN ASSOCIATES	7- 12	11 1/2	0	0.0
N	WANG LABS.	7- 15	13 7/8	- 1/8	-0.8
N	XEROX CORP	51- 86	75 1/4	- 1/2	-0.6

LEASING COMPANIES

EXCN		1975 RANGE (1)	CLOSE MAY 28 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 5	3 3/4	- 1/4	-6.2
A	COMMERCE GROUP CORP	2- 4	3	+ 1/8	+4.3
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
N	DATRONIC RENTAL	1- 1	1/2	0	0.0
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	3- 5	4 5/8	- 1/8	-2.6
O	EDP RESOURCES	2- 2	2	0	0.0
A	GRANITE MGT	1- 5	4 1/8	+ 1/4	+8.4
A	GREYHOUND COMPUTER	2- 3	3 1/8	0	0.0
A	ITEL	3- 7	7 1/8	+ 5/8	+9.8
N	LEASCO CORP	4- 8	5 3/4	+ 1/4	+4.5
O	LEASPAC CORP	1- 1	1/2	+ 1/4	+100.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 3	2 1/8	+ 1/8	+6.2
A	PIONEER TEX CORP	2- 4	4 3/8	+ 3/8	+9.3
A	ROCKWOOD COMPUTER	0- 1	3/8	0	0.0
N	U.S. LEASING	9- 14	10 1/8	- 1/4	-2.4

EXCN: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCN		1975 RANGE (1)	CLOSE MAY 28 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	1	- 1/8	-11.1
A	APPLIED DATA RES.	1- 2	2 3/4	- 1/8	-4.3
N	AUTOMATIC DATA PROC	29- 58	57 7/8	+2 1/4	+4.0
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	CENTRAL DATA SYSTEMS	3- 3	3 1/4	0	0.0
O	COMPUTER DIMENSIONS	2- 8	5 3/4	+ 1/2	+8.5
O	COMP ELECTION SYSTMS	3- 3	5 1/4	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/8	0	0.0
O	COMPUTER NETWORK	1- 2	2 1/8	+ 1/2	+30.7
N	COMPUTER SCIENCES	2- 5	4 3/4	0	0.0
O	COMPUTER TASK GROUP	1- 1	3/4	0	0.0
O	COMPUTER USAGE	2- 4	2 1/2	0	0.0
O	COMSHARE	3- 4	4 1/8	+ 1/4	+6.4
O	DATATAB	1- 1	1 1/8	0	0.0
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 28	23	-1 1/2	-6.1
O	INFORMATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/4	0	0.0
O	KEANE ASSOCIATES	2- 3	2	-1 1/4	-38.4
O	KEYDATA CORP	2- 3	2 1/8	0	0.0
O	LOGICON	3- 5	4 5/8	- 1/8	-2.6
A	MANAGEMENT DATA	1- 3	2 5/8	+ 1/2	+23.3
O	NATIONAL CSS INC	6- 14	13 1/4	+1 3/4	+15.2
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 14	13	- 3/4	-5.4
N	PLANNING RESEARCH	2- 5	4	+ 1/4	+6.6
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 4	4	0	0.0
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/4	0	0.0
O	TYMSHARE INC	7- 20	20	+1 1/4	+6.6
A	URS SYSTEMS	2- 3	2 3/8	- 1/4	-9.5
N	WYLY CORP	2- 4	3 1/8	+ 1/8	+4.1

PERIPHERALS & SUBSYSTEMS

EXCN		1975 RANGE (1)	CLOSE MAY 28 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 8	8 7/8	0	0.0
O	ADVANCED MEMORY SYS	1- 5	4 1/4	+ 1/8	+3.0
N	AMPEX CORP	3- 7	8 8/8	+ 3/4	+12.7
O	ANDERSON JACOBSON	1- 3	2 5/8	- 1/4	-8.6
O	BEEHIVE MEDICAL ELEC	1- 5	4 1/2	- 1/8	-2.7
A	BOLT,BERANEK & NEW	5- 9	7 5/8	+ 5/8	+8.8
N	BUNKER-RAMO	4- 7	8 3/8	0	0.0
A	CALCOMP	4- 7	5 3/8	- 1/4	-4.4
O	CAMBRIDGE MEMORIES	3- 5	3 1/8	0	0.0
N	CENTRONICS DATA COMP	7- 22	21	+2	+10.5
O	CODEX CORP	15- 38	37 1/2	+3 1/4	+9.4
O	COGNITRONICS	1- 1	1 1/2	+ 1/8	+9.0
O	COMPUTER COMMUN.	1- 1	3/8	- 1/8	-25.0
O	COMPUTER CONSOLES	3- 7	5 3/4	- 1/2	-8.0
A	COMPUTER EQUIPMENT	1- 2	1 3/8	- 1/4	-15.3
O	COMPUTER MACHINERY	1- 2	1 3/8	+ 1/8	+10.0
O	COMPUTER TRANSCEIVER	1- 2	1 3/8	0	0.0
O	CONTEN	2- 5	3 3/4	- 3/8	-9.0
N	CONRAC CORP	12- 20	17 3/4	+ 3/8	+2.1
O	DATA ACCESS SYSTEMS	1- 3	2 1/4	0	0.0
O	DATA 100	5- 16	14 3/8	+ 5/8	+4.5
A	DATA PRODUCTS CORP	2- 5	4 5/8	0	0.0
O	DATA TECHNOLOGY	1- 3	2 1/2	+ 7/8	+53.8
O	DATUM INC	1- 2	7/8	0	0.0
O	DECISION DATA COMPUT	4- 7	5 1/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIVAN CONTROLS	1- 1	1 3/8	0	0.0
N	ELECTRONIC M & M	1- 2	2	0	0.0
O	FABRI-TEK	1- 1	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	1- 2	2	0	0.0
N	HAZELTINE CORP	3- 4	3 1/4	- 1/8	-3.7
N	HARRIS CORP	18- 23	22 1/2	+1 7/8	+9.0
A	INCOTERM CORP	3- 7	6 1/8	+ 3/4	+13.9
O	INFOREX INC	2- 5	3 5/8	+ 3/8	+11.3
U	INFORMATION INTL INC	8- 12	11 1/4	+1 1/8	+11.1
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/2	0	0.0
A	MILGO ELECTRONICS	8- 19	17 3/4	- 7/8	-4.6
N	MOHAWK DATA SCI	1- 5	3 1/4	+ 1/8	+4.0
O	OPTICAL SCANNING	1- 3	2 3/4	0	0.0
O	PERTEC CORP	2- 8	6	- 3/4	-11.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1/4	- 1/8	-33.3
O	QUANTOR CORP	2- 5	3 1/4	0	0.0
O	RECOGNITION EQUIP	2- 8	5 5/8	+ 7/8	+18.4
N	SANDERS ASSOCIATES	3- 9	8 3/8	+ 3/8	+4.6
O	SCAN DATA	1- 3	2	0	0.0
O	STORAGE TECHNOLOGY	6- 14	13	+ 3/4	+6.1
O	SYCOR INC	5- 14	12 1/2	+ 1/2	+4.1
O	TALLY CORP.	1- 5	4 3/8	- 1/8	-2.7
O	TPC INC	1- 3	2 1/4	0	0.0
N	TEKTRONIX INC	18- 37	36 1/8	+ 5/8	+1.7
N	TELEX	1- 3	2 1/8	0	0.0
O	WANGCO INC	4- 7	6 1/8	- 1/8	-2.0
O	WILTEK INC	1- 4	3	0	0.0

SUPPLIES & ACCESSORIES

EXCN		1975 RANGE (1)	CLOSE MAY 28 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 5	5 1/4	0	0.0
A	BARRY WRIGHT	5- 7	5 7/8	+ 1/8	+2.1
O	CYBERMATICS INC	1- 1	3/4	0	0.0
A	DATA DOCUMENTS	28- 42	35 1/2	-3	-7.7
O	DUPLEX PRODUCTS INC	12- 23	21	+ 1/8	+0.5
N	ENNIS BUS. FORMS	5- 7	6	0	0.0
O	GRAHAM MAGNETICS	5- 9	7 3/4	0	0.0
O	GRAPHIC CONTROLS	8- 23	18 1/2	+3	+19.1
N	3M COMPANY	43- 88	85 1/2	+ 1/2	+0.7
O	MOORE CORP LTD	39- 48	47	- 3/4	-1.5
N	NASHUA CORP	15- 22	20 3/8	- 1/8	-0.6
O	REYNOLDS & REYNOLD	11- 24	18 1/2	-1 1/2	-8.3
O	STANDARD REGISTER	11- 18	16 1/2	0	0.0
O	TAB PRODUCTS CO	4- 8	8 3/4	0	0.0
N	UARCO	17- 24	20 8/8	-1 3/8	-6.2
O	VANIER GRAPHICS CORP	4- 7	6 1/2	0	0.0
A	WABASH MAGNETICS	3- 5	4 1/4	- 1/8	-2.8
N	WALLACE BUS FORMS	15- 23	21 1/2	- 1/2	-2.2

Of course you should.

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Data Communications

Course #1010–

Practical Data Communications Systems and Concepts

This course will give you the information you need to master the newest developments in Data Communications. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers. This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows:

Orlando—Jul. 2-3
Washington, D. C.—Jun. 9-10

Course #1020–

Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations.

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is $450. Additional registrants from the same company qualify for a reduced rate of $400. Current schedule is as follows:

Los Angeles—Jun. 16-18

Data Base Design

A practical approach to the design, implementation, and maintenance of data base systems.

Effective data base system design requires both a complete knowledge of the facilities provided by a data base package, and a basic understanding of the mechanisms which can be employed to construct data base systems. In fact, the former is of questionable value without the latter.

This course is a package independent examination of the techinques required for the design of effective data base systems. The topics covered include:

- *Effective Record Design*
- *Physical Storage Techniques*
- *Optimum File Organization and Indexing Techniques*
- *File Integration*
- *and much more*

Given in association with Leo J. Cohen and Performance Development Corporation, this course reinforces the lecture material with workshops, in which attendees apply the techniques, just learned, to practical problems.

You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst.

This course runs for 3 days and costs $350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule:

New York — September 22 - 24
Denver — December 1 - 3

Legal Tools for Computer Contracting & Protection

A seminar that gives you the legal tools you need for effective negotiations, agreement drafting, warranties, security, tax planning and software protection.

The impact of the law is felt in virtually every aspect of the computer industry, and you need to know how to apply the legal rules in a positive way to increase you advantage in dealing with vendors that supply your installation. This course teaches you how to avoid the legal pitfalls that can be costly and embarrassing to you.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author, educator and expert in the field of Computer Law, you'll learn how to protect your interests in subject areas like these: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, as well as Techniques in handling any transaction. And practical discussion and review of your own contracts is an added feature of this seminar.

You should attend this seminar if you are involved in contracting for the use of computers or computer services–whether as a Corporate Executive, DP Manager, Contract Administrator, Consultant, Inside Counsel, or as a Private Practitioner involved with clients who use computers. Cost for the entire 2½ day seminar, including continental breakfasts, luncheons, and complete resource materials is $325. Additional registrants from the same company are charged only $275. Current Schedule:

New York — St. Moritz — June 4-6

Key-to-Storage Systems

How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem—and a big headache—as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be:

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

Chicago — Hyatt Regency O'Hare — June 9-11

To: Ed Bride, Vice President, Editorial Services, Computerworld
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